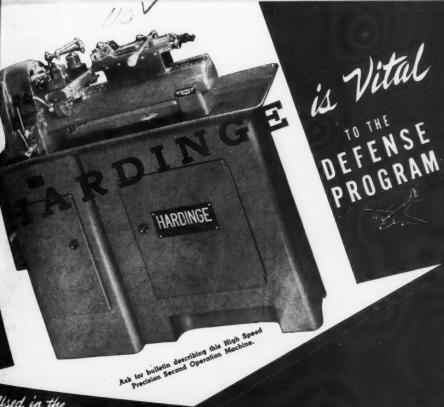
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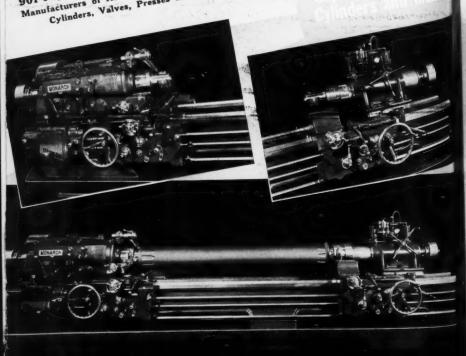
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# Mochine Shop DECEMBER, 1941 VOLUME 14 . NUMBER 7 Outents

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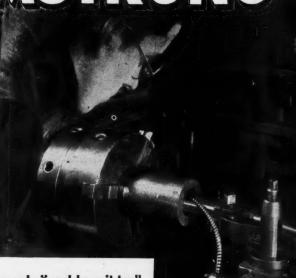
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# Machine Shop

CINCINNATI, OHIO

DECEMBER, 1941

Vol. 14, No. 7

## We Present --

—as our initial offering this month—a story concerning a problem which is facing many manufacturers in the present emergency—that of moving from an inadequate plant into a new, modern factory building without holding up production. The experience of the Pratt & Whitney Aircraft Company may prove of value to others.

—on page 98—a discussion of the place that adequate lighting plays in industrial defense against sabotage. In addition to a thorough discussion of the subject, the writer presents a number of drawings which show the types of lighting best adapted to various conditions. And let us not forget that if our Government elects to participate actively in the present international conflict, saboteurs—organized and waiting—will descend upon our defense industry like a swarm of locusts.

-on page 110—the second in the series of articles on "Tooling the Automatic Screw Machine," by B. C. Rundquist. Mr. Rundquist gets right down to cases in this section and presents not only a series of formulas for determining spindle speeds, selecting cams, selecting change gears, and so on, but also gives us several sample tool layouts and setup charts. This material will be invaluable to anyone concerned with automatic screw machines.

on page 126—a report giving the high lights of the National Safety Congress which was held recently in Chicago. This report was written especially for those of our readers who are interested in safety but who were unable to be present at the Congress.

-on page 136—an outline of the duties that will fall to those who may be carolled in the Civilian Defense Corps if we are faced with war conditions, together with illustrations and descriptions of the insignia that will be used to indicate the different types of workers in the enrolled volunteer worker groups. Maybe we are looking too far ahead, but we believe it is better to be prepared for an emergency which may never come than to continue unprepared for one which is, at the moment, headed this way.

-some interesting data under the section heading "Modern Equipment at Work" and usual "Ideas from Readers." Incidentally, the Editor got something off his chest on his own page (page 178) and we hope that some of our readers, at least, will agree with him.

TOOL O

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Looking down the "green" or preliminary assembly line in Pratt & Whitney Aircraft's new engine assembly plant. Double-row engines are assembled on the left side and single-row engine along the right side of center. Sub-assembly benches to the right and left of the two lines led completed sub-assemblies to the final assembly lines.

# A Modern Aircraft Manufacturing Plant

The problem of moving from an old plant into a new one without disturbing production is facing many manufacturers in these times. But Pratt & Whitney Aircraft did it The author tells how.

By HERBERT THAYER BRUCE

THE task of moving an aircraft engine assembly plant from one building to another without disturbing production is a huge one, but the fact that it can be done has been proved by The Pratt & Whitney Air-

craft Division of United Aircraft Corporation at East Hartford, Connecticut. The operation involved the moving of more than 400 motors is various stages of completion from the old assembly department in the off

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Inspect testing, benche inal plant to the new one, the taking down and recrecting of some 40 hoists with a lifting capacity of approximately 75,000 tons, and the moving of approximately 340 disassembly racks and 780 inspection and assembly benches for which a floor area of some 25,000 square feet is required.

Planning engineers had been busy on preparations for several months in advance. They had determined to the Nth degree the exact spot each piece of equipment was to occupy. While operations were proceeding normally in the old plant the foundations for the new one were dug, the steel was brought in and the concrete was poured, planning tables were set up and paper "cut-outs" representing the different types and kinds of machines to be used were pinned in place on the layout sheets, a new conveyor system was installed, the flow of finished parts was gradually rerouted to

the new stores department from which the new assembly line would be fed, and machinery, benches, shelves, racks, hoists, and an interminable list of other equipment was brought into the new plant by the car load.

Yet there was no stopping of production machines or operations; no fanfare; no confusion. When the time came for the transfer to be made it was taken in its stride, without tension or excitement.

The moving operation began as the first shift clocked out at 3:30 on a Friday afternoon. As the day workmen left the plant, an army of a thousand men set to work moving the partly completed motors, hoists, work benches, and other working equipment into the new plant and arranging it so that the engine builders could take up exactly where they had left off. When the first shift returned to work the following Monday morn-

Inspection benches in the new engine assembly building at Pratt & Whitney Aircraft. After initial testing, each engine is completely disassembled and the parts are laid out on one of these benches for minute inspection. Over each bench is a battery of special fluorescent lights which provides shadowless illumination.



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ing they found the new assembly line waiting for them. The gigantic task had been completed at 9:40 o'clock the previous evening, and had required but 52 hours and 10 minutes.

The construction of new Plant F was essential to the defense commitments of Pratt & Whitney Aircraft. With these additional 400,000 square feet of production space, plant facilities of this corporation have been quadrupled within a little more than two years. The new addition is approximately the size of the original plant in 1939 when the expansion program was inaugurated; the total production space is now 1,600,000 square feet.

A million horsepower a month in airplane engines is now coming off the assembly lines, and the company expects that this production will have been doubled by the end of the year. The importance of this figure becomes apparent when it is known that there are only two companies

in this country—Wright and Pratt & Whitney—capable of producing combat engines in large quantities up to the present time.

Plant F is the last word in factor design. The building is of the "Monitor" steel and brick type of construction, consisting of a two-story & foot bay flanked on either side by a 128-foot bay. The unusual width of the working space greatly facilitates straight line assembly. The available floor space has been augmented by construction of a mezzanine upon which are located the stores department for the smaller items. Heavier parts are stored on the ground floor. Space in the basement has been given over to first aid rooms, locker rooms for employees, and the new cafeteria At the rear of the assembly floor is the shipping room space where the completed engines are packed in huge boxes and started on their way to their destinations. Overhead wingtype rotating heating units provide

Conveyor system which serves the main-floor storage area in the new engine assembly building. This building was erected specifically to increase the output of radial, air-cooled aircraft engine for national defense.



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View of part of the packing and shipping section of the new engine assembly building at Pratt & Whitney Aircraft. Here final adjustments are made on the engines prior to their being crated in shipping boxes.

temperatures so uniform that the workmen are scarcely aware that heat is being circulated. Mercury vapor and incandescent lamps provide ample light for close work.

In order to handle the moving job to best advantage, the crew was divided into halves, one section being stationed in the new building and the other in the old assembly department. The men in the new building were required to clear the way for the oncoming storm of tables, benches, bins, and shelving bays of every description and to mark the floors for the exact location of each machine as planned by the plant engineers; those stationed in the old building tagged each engine, part, and piece of equipment with directions for its new location. Meanwhile, the building of engines continued as though nothing out of the ordinary were happening.

Power for transportation was sup-

plied by eight tractors of the caterpillar type and four electric trucks capable of carrying from five- to tenton loads. Electricians and pipe fitters went to work cutting out power lines, compressed air lines, and oil and kerosene lines in the old floor and as rapidly hooking them up in the new one as each machine was moved into its new location. The heavy machines came into the plant intact, having been moved on skids which could be hauled by the tractors.

Spotters stationed along the way directed the truckers to the proper destinations through predetermined traffic lanes; thus the traffic soon became an endless line of full trucks going in one direction and empty trucks going in the other. At each unloading point the materials were unloaded by a squad who placed each item in its proper place for instant availability when the moment for re-

rovide

uilding. engines sumption of production should arrive.

During Saturday afternoon the old assembly line ceased to function and simultaneously the new assembly line went into action. Within two days after the final part was moved production was proceeding as smoothly as though no change had occurred and on the following day—Wednesday—an all-time high daily output record was established.

The new conveyor system is an important part of the new facilities. Extending from the receiving room of Plant E, where purchased finished parts are received from freight truck deliveries and opened and inspected, the conveyor continues on through the entire length of the assembly building and back again in an uninterrupted circuit. It is capable of carrying a live load of 65,000 pounds at speeds of from 10 to 35 feet a minute. Power is supplied by two three-horsepower motors.

Engines are assembled on either one of two "green" assembly lines; when a sub-assembly is completed, it goes to either one or the other of these lines depending upon whether the engine upon which it is to be used is of the single row or double row type. These "green" assembly lines extend, parallel to each other, about half the length of the building. Extending the other half of the building are the "final" assembly lines, similarly divided for single row or double row engines.

Suspended over each assembly line is a monorail conveyor, equipped with chain falls and switches by which heavy parts may be shifted to any section of the line at will and "slow" engines—unable for some reason to proceed—are shunted to one side in order to keep production flowing.

The stands on which the engines are assembled roll in steel channels sunk into the wood block floors. Rows of specially lighted tables adjacent to

the engine assembly lines provide for a final inspection of all parts which enter into the engine assemblies. Rows of fluorescent lighting units over the benches provide light of a "daylight" quality which eliminates shadows and aids in the making of thorough inspections.

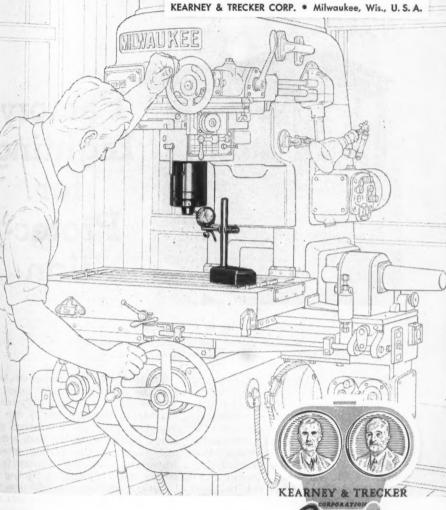
As each engine is completed, it is transported to the test house through a 1600-foot passageway which connects the assembly building with the test house and dynamometer department. The engines are moved on an electrically-operated monorail system by which they are transported back and forth without confusion. In the packing and shipping department at the end of the final assembly lines the crated engines are lifted by means of 5-ton prong trucks which are also used to carry them to the enclosed and heated railway loading platform extending along the outside of the building.

In planning the new plant, the company has given the utmost consideration to employee convenience. To provide a high quality of food at a minimum price, the basement houses a new cafeteria which covers 14,980 square feet and seats 800 people. The locker rooms for the exclusive use of assembly line workers cover 13,000 square feet and accommodate 3,400 men. In addition to a completely-equipped hospital in the employment building, several first aid rooms are located at strategic points throughout the factory.

From a crew of 25 men this organization has grown until it is now one of America's great industries, housed in a mammoth plant of the most modern design, devoted to the production of power plants for the fighting planes upon which America is depending for its First Line of Defense.

If you can't fight, you can help the Deissa Program by buying Defense Bonds or Stamp at your bank or post office.

Checking run-out and setting of spindle and head on Milwaukee Model D Rotary Head Tool and Die Milling Machine — a typical inspection to maintain Milwaukee standards of accuracy.



Milwaukee MILLING MACHINES

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Fig. 9 — Incandescent Searchigh Controlled from the Guard Ro Provide Supplementary Light Wa and Where Needed

# Factory Lighting for Protection

By H. E. MAHAN

Manager General Electric Illuminating Laboratory Schenectady, N. Y.

MERICA'S Defense Program is A absolutely dependent upon American Industry, consequently industry is faced with the responsibility of safeguarding its plants against acts of sabotage and espionage. Obviously, the first step to be taken toward this end is to keep all unauthorized persons off the premises. During daylight hours the ground can be kept free from intruders quite simply by the use of the proper fencing and an adequate force of guards, but the darkness that comes with the night multiplies the task. Night darkness not only makes the detection of intruders difficult, but serves to aid those who would make attempts at entry.

The handicap of darkness can, however, be offset to a great extent protective. Iighting. Protecting lighting is lighting set up, not he manufacturing or processing proses, but to light the dark command parts of the factory grown where saboteurs might attempt to the ter or hide. Protective lighting pends for its effectiveness upon the systematic and intelligence of those units.

Before reviewing the several met ods of lighting commonly employ let us consider the fundamental of siderations by which the design should be guided. These princip can b their with

cumstance plant ma ment. T

1. Disc by surror lighted can be applied generally, although their relative importance will vary with individual plants and the cir-

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would-be trespasser must pass.

2. Provide a level of illumination in this zone adequate for the detection

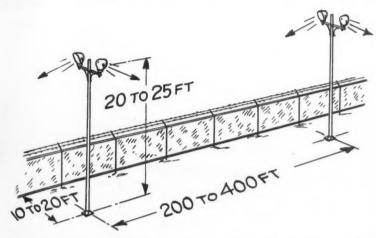
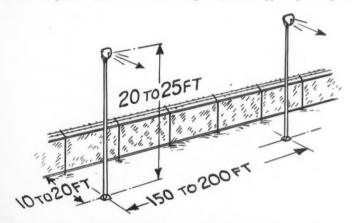


Fig. 1—In This Drawing and the Next Five, Several Systems for the Protective Lighting of Factory Fences are Presented. This Drawing Shows α Highly Effective Method

Fig. 2—In This Design the Poles are Set Closer Together, Each Supporting a Single Floodlight



cumstances peculiar to a definite plant may require an unique treatment. The fundamentals referred to are:

1. Discourage attempts at entry by surrounding the property with a lighted zone through which the of the trespasser.

3. Give special attention to the problems set up by adjacent railway sidings, alleys, roofs of adjacent buildings, wooded or water approaches, and entrances or exits.

4. Locate lamps so that the pos-

December, 1941

MODERN MACHINE SHOP

sible failure of one lamp will not create a dark area.

5. Locate the lamps so that glare will not handicap the vision of the

from the view of persons outside of the property.

7. Locate poles, lighting equipment, and electrical distribution sys-

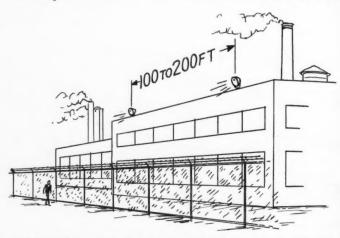
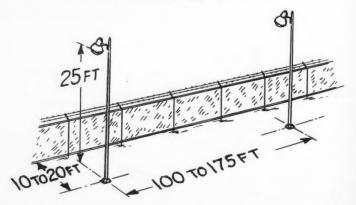


Fig. 3—Where Buildings are Close Enough to the Street, Poles are Unnecessary

Fig. 4—In This Design the Poles are Set Closer Together and the Pendent Luminaires are

Directed at the Area Beyond the Fence



guard, and so that it will not act as a hazard to highway traffic, or to marine or railway operations, or be a nuisance to occupants of neighboring buildings.

 Keep guard stations and patrol routes relatively dark in order to conceal the guard as far as possible tems inside the property fence, or where it will not readily be accessible to persons bent upon malicious damage.

8. Employ equipment and installation methods that are dependable and can conveniently be serviced.

Protective lighting may be con-

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Fig. 5—TI

avenues, suppleme control plants, f all requi

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sidered as of four general classifica- all four types of lighting may find tions: (a) fence lighting, (b) area application. ighting, (c) miscellaneous courts,

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The efficient lighting of fences may

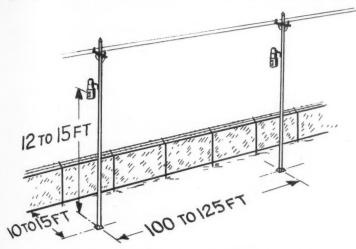
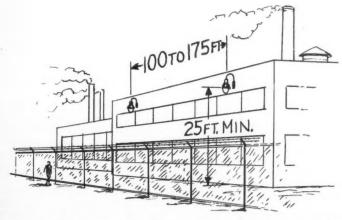


Fig. 5—The Fresnel Lens Lanterns Employed in This Design Throw a Glare that is Directed Toward Surrounding Grounds

Fig. 6—Pendent Luminaires May Be Attached to Buildings Where the Light Serves Factory Operations as Well as for Protection



avenues, alleys, and so on, and (d) supplementary lighting under the control of the guards. In many plants, fence lighting alone will meet all requirements, but in larger plants

be accomplished by several different methods, each possessing certain characteristics that make the individual method adaptable for a certain set of conditions. The flood-lighting systems illustrated in Fig. 1, 2, and 3 can be applied where the glare that characterizes a high candle power beam may be used without interfering with normal operations on the property or to neighboring activities.

For such flood-lighting systems,



Fig. 7 — Two-Way Refractor-Type Luminaire Supported from a Tilling Bracket Effectively Meets a Wide Range of Fence Lighting Conditions

floodlights of the medium angle type and of 500/1,000/1,500 watts capacity are generally used. Because of the overlapping of the beams, particularly in the case of the two-light system illustrated in Fig. 1, this system is perhaps least affected by lamp failures. It is not, however, suitable for use at plants adjacent to highways or streets, navigable water, or railroads.

The suspension luminaire in common use for street lighting finds wider application than the floodlight, because of its greater freedom from objectionable glare. Systems in which units of this type are em-

ployed may be operated from either series or multiple circuits, and a general may be installed at a lower cost than comparable floodlights systems. A wide variety of light distributions may be obtained by the use of refracting and internal an external reflecting accessories at meet the requirements of the conditions under consideration.

symmetrical distribution light with the maximum candlepone directed approximately parallel with the fence line best meets the general situation. two-way A type o luminaire refractor with an adjust able bracket such as that shown in Fig. 7 has been found particularly effective for fence lighting where patrol road parallels the fence line The accurate control of the limit from this luminaire results in a very definite illuminated pattern on the ground and this pattern may be placed wherever desired with respect to the fence by adjusting the ange of tilt of the bracket.

The luminaire may be equipped with a 6,000/10,000-lumen sens lamp or a 300/500-watt multiple lamp with the lamps spaced as shown in Fig. 1, 2, 3, 4, and 6. Where buildings are close to the fence line, the luminaires may be bracketed from the face of the building as shown in Fig. 6.

The systems in which the Fresnel lens lantern is employed is limited to sparsely-settled communities where glare may be directed toward adjacent properties without inconvenience to others. Under such conditions glare serves as a deterrent to those The who might attempt entry. method employed in installing this type of equipment is illustrated in Fig. 5. The units are equipped with either 300-watt multiple lamps @ 6,000-lumen series lamps. The light distribution takes the form of a fu approximately 180 degrees in the

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## LARGE jobs . . . SMALL machines . . . BIG time savers . . . LITTLE overhead

In other words, drilling efficiency is the result of the Cincinnati Bickford Tool Company's exclusive specialization, for over a half a century, in Radials and Uprights.

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horizontal and approximately 35 grees in the vertical, and is directly over the fence to the area beyond

The lighting of large areas can accomplished by means of a towers centrally located with spect to the area to be served supporting either floodlights or perfect that the spect is shown in Fig. 8. This class of a ging is frequently required for properations as well as for police poses and therefore warrant higher level of illumination that for the latter use only.

Floodlights of the wide angle t are most suitable where the requi coverage extends 150 feet or beyond this distance the med angle type will be found most eff tive. General conditions are satisf by providing 0.10 to 0.25 watts square foot of area. Pendent minaires for this service are ge ally of the type delivering metrical distribution of light installed on the basis of 0.10 to 0 watts per square foot of area, whi will meet the need for general of ditions.

The poles or towers for the system will vary between 50 feet a 70 feet in height, depending upon a occupancy of the area and the puing of the towers. The higher a

towers, the better the d tribution of light with spect to uniformity and a sence of shadows. A circu support ring on the top permits arranging the lighting units in a manner fare able for radially distribute

Fig. 8—Large Areas are Econocally Illuminated by High Town Supporting Pendent Luminates Floodlights

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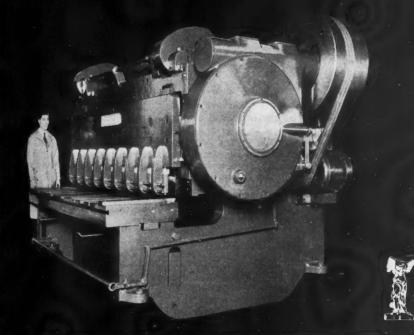
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Write for recommendations based on experience in building Cincinnati All-Steel Shears for arsenals, navy yards, and manufacturers of armament.





SHAPERS SHEARS BRAKES
CINCINNATI, OHIO.

the light from the tower.

Supplementing the fixed lighting it has been found useful to provide searchlights at the guard stations, Fig. 9 (at the head of this article). to permit investigating suspicious actions outside the property or to augment the fixed lighting within the property in cases of emergency. These searchlights are of the pilot house control type which permits installation of the searchlight on the roof of the guard house with the control handle in the guard room beneath. A searchlight in common use for this purpose is the 18inch incandescent type equipped w a 1,000-watt or 1,500-watt spotling type of lamp.

A study of conditions and quirements on the ground is essential preliminary step to provi ing adequate protective lighting industrial plants. Requirements w and ways and means of satisfyi the conditions existing at any ticular plant is a matter for vidual study. Under the condition that exist at the moment, hower adequate night-lighting of the f tory grounds is an item of protecti which should not be neglected.



New \$5,500,000-Diesel Engine Plant Now Being Built by Fairbanks-Morse Company at Beloit, Wisconsin

#### Fairbanks-Morse Building New Diesel Plant

More than 300,000 square feet of floor space will be included in the new dis engine plant now being built by The Fairbanks-Morse Company at Beloit, Wisco for which the Federal Government has authorized an appropriation of \$5,500 The project will be completed under emergency priorities and is expected to prod diesel engines for the United States Navy within the year.

The new plant will have a frontage of 660 feet and a depth of 460 feet. Produced in the contract of the contract o

tion in the new shop will provide employment for from 1200 to 1500 additional wa men. Fairbanks-Morse is now engaged in the production of diesel engines for bl

propulsion and auxiliary marine service for the Navy.

Bond Stock Gears, Speed Reducers, and Industrial Equipment are the subject of a 184-page pocket-size catalog, designated as the No. 59A, which is now being distributed by the Charles Bond Co., Dept. MS., 617-623 Arch St., Philadelphia, Pa. The catalog covers miter, spur, bevel, change, and spiral gears,

worms, pinions, sprockets, vertical horizontal speeds reducers, flexible sulated couplings, steel and iron grow pulleys, sheaves, endless ruber shaped belts, pillow blocks, shaft lars, universal joints, bushings, naball, thrust, and annular bearings, in casters, bench legs, dollys, and s Copy free upon request.

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• Don't let today's pressure cause you to lose sight of the fact that the turret lathe you buy today will be in your service long after the present emergency is over. There are many "Extras" in addition to the fine quality of the machine tool itself, which make it well worth while to make sure your new turret lathe is a Warner & Swasey. Some of these important extras are:

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# Gn Engineering SCOOP, THE DOUBLE LOW HUNG SPINDLE DRIVE OF THE "AMERICAN" 32 SPEED HOLE WIZARD

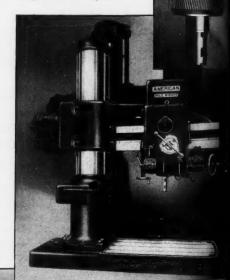
is the newest thing in spindle drives—is a masterpiece of engineering and adds years to the effective life of the machine.

It consists of two gears located on the lower portion of the spindle at the bottom of the head, thus bringing the driving gears as close as possible to the work. By using two driving gears, a large one for the low speeds and a small one for the high speeds, severe operations are performed at low tooth pressures and high-speed work at low gear velocities. This ideal combination cannot be secured in any other way.

Spindle and spindle sleeve are of "Nitralloy" steel nitrided for extreme surface hardness. The spindle is ground to very close

limits and the sleeve is honed to precision limits. These units being hardened are practically impervious to wear. The hardening of these members also permits a much closer fit, resulting in a precision mounting that lends itself to the most accurate drilling and boring for tool room operations.

The drilling sleeve is mounted on Timken Precision Roller Bearings at top and bottom with provision for take-up in case of wear. This construction insures not only a friction-free drive but also one in which the original accuracy can be easily maintained for many years.



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The tougher the test . . . the more decisive the proof of SUNICUT's outstanding quality as a cutting oil ... and proof that it allows a higher P.Q $^{\circ}$  to be set.

This was again proved by engineers of one of the largest manufacturers of steel pipe. Their defense and supply requirements demanded longer die life on pipe threading operations. Actual tests run on thousands of feet of pipe proved SUNICUT doubled the die life as compared to tests made with the best competitive

Now their 16 machines are operating at a rate of 39' per minute . . . and they've set a new high in P-Q\* of 1.440.000 feet of pipe for every twenty-four hours of

Amazing? Yes, but typical of the records set by this modern, production-proved, sulphurized cutting oil. If you're interested in keeping your machine-tools running at rated capacity-plus and establishing a higher Production Quotas  $\ldots$  call in a Sun Oil Engineer and get the facts on SUNICUT.

SUN OIL COMPANY, Philadelphia, Pa.





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# Tooling the Automatic Screw Machine, II

In this article the author discusses planning and estimating and tells how to select cams, figure tapping and threading time, and determine production. Several tooling layouts and setup charts are included.

By B. C. RUNDQUIST

The National Acme Company, Cleveland, Ohio

BEFORE preparing to set up a multiple spindle automatic machine for a new job it is necessary, of course, to make several preliminary calculations. These will include (a) plan of the sequence of operations that will be necessary to complete the piece, (b) a list of the tools that will be required, (c) an estimate of the spindle speeds and tool feeds suitable for the stock and tools, (d) selection of the proper spindle speed change gears and feed change gears, (e) selection of cams with the correct rise for each of the toolslides, and an estimate of production.

In many shops these preliminary calculations are the function of the estimating department, which furnishes the automatic machine department foreman, set-up man or operator with a layout chart. If such a layout chart is not furnished, the automatic department should work out these calculations before proceeding with the actual setting up. A very careful study of the design, construction, and tooling equipment of the machine to be used should be made, as different makes of machines require different types of tools.

Since all multiple spindle auto-

matic design principles dictate that the time to make one piece can never he less than the time required for the longest single operation, the first step is to decide by preliminary calculations which will be the longest single cut.

First, it is important to determine the best method of applying tools to the work. Remember that most mutiple spindle automatics have two tool positions available for each spindle-eight positions on the four spin dle, twelve on the six spindle and sixteen on the eight spindle. Thu the longer operation may be divide between two or more tools on the end toolslide or on the side slides taking advantage of as many of the tool positions as will be practicable to obtain the greatest possible production or degree of finish. The best practice is to lay out the job in a way that will avoid crowding any one tool with a heavier feed than ! will stand without too frequent re sharpening. Otherwise, the down time for tool regrinding will result in loss in production that will offset to gain made by dividing the operation

A decision as to what tools will be used on all slides must be govern

MODERN MACHINE SHOP

December, 1941

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An Unground, Spiral Gashed, Multiple-Thread lill of this type is used on the job described. Spiral asked Thread Mills are recommended whenever ey can be used, because they provide a continuous ion which keeps a uniform torsion on the machine de, as contrasted to the intermittent action of a night gashed cutter. Results are minimum vibraand chatter - better and smoother threads d longer cutter life.

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thine - Lees-Bradner Thread Milling Machine. iding Method - Shaft is held in collet chuck at one end, and supported on a center at the other end.

reduction — Sixteen per hour for the largest thread, 1% long x 1.87° O.D.

hread Mill Dimensions — 4" x 11/2" x 13/4" straight

hread Mill Life - 128 shafts per sharpening. Each mill is resharpened after 8 hours of operation.

## **Cutter Life 128 Pieces Per Sharpening**

This Barber-Colman Unground Multiple-Thread Mill with spiral gashes gives a leading tractor manufacturer accurate work, fast production and long cutter life.

For example 12 pitch threads are milled on tough steel transmission shafts, 1 1/8" diameter, at the rate of 16 per hour. Cutter life is 128 shafts per sharpening. Top cutter performance and smooth precision cut threads are maintained by resharpening this thread mill after each 8 hours of operation.

B-C Thread Mills consistently demonstrate their ability to give high, accurate production at low tool cost. This is because they are correctly designed and produced. Scientific metallurgical tests made on each shipment of steel determines the proper heat treatment for most efficient results. In addition, new, modern heat treating equipment accurately controls all factors resulting in the production of only ARRES

Why not try Barber-Colman Unground Thread Mills and receive the excellent results that others are reporting from their use?

the highest standard quality tools.

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General Offices and Plant 207 Loomis St., Rockford, Illinois, U. S. A.

ed almost entirely by tooling experience and by the character and shape of the work. In selecting tools, it is good practice to machine any irregular portion of the work with a forming tool. When this tool extends over several shoulders, its diameter automatically takes care of all the diameters and shoulders covered, thus insuring uniformity. If the outside diameters of the piece must be held to very close tolerances, a shaving tool should be used for the finishing operation.

While drilling, turning, forming, or cutting off is usually the longest operation and is therefore the one usually divided between two or more cuts, it must be remembered that threading and tapping must be completed in one operation. As a matter of fact, it is a rare case when threading is the longest operation, but where a solid tap is used, enough time must be allowed for the tap to go into the work, the clutch to engage to start the tap back out of the work, and the tap to clear the work before the spindle carrier indexes. This point is particularly important when the piece is to be cut off in the same position as the tapping.

To arrive at satisfactory results in setting up, the first step is to determine the most suitable spindle speed for the work and the correct feeds for the tools, taking into account the kind of steel, brass, or other material Recommended cutting to be cut. speeds and feeds which can be used as a guide for machining almost any material will be found in various handbooks, but due to the many factors which affect machining, it will be found from experience that speeds will have to be varied according to the job and kind of tooling used.

A tooling layout or set-up chart for making one style of spark plug shell on a 1¼-inch RA-6-Acme-Gridley Automatic is presented in Fig. 5.

It will be noted that in the siri position a rough form tool remove about half the stock and a spot dril centers the end for the drill to follow In the first position a finish form tool is used to turn the piece down to the several diameters necessary and to break down at the collet en ready for the cut-off. Thus between the sixth and the first positions the time required to break down to stock ready for the cut-off has been divided between two tools and at the same time the different diameters and radius have been turned. Also in the first position a knee tool has been used to face the end to the proper length.

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In the second position, a his speed drilling attachment is used a drill the longer hole, which is finished by the time the other operations as finished. In the third position, a shaving tool is used to perform the finish turning operation, which make it possible to hold the several diameters to a very close tolerance and the same time give the piece a god finish. While the saving is taking place, the hole is reamed to find size on all diameters.

The tapping operation is performs in the fourth position and the pier is cut off in the fifth. The actual time for completing all of these operations, plus indexing and feeding the stock for the next piece, is 10 seconds.

#### Determining Spindle Speeds

Following is the formula common used to find the speed in surface fet per minute:

Inch dia. x 3.1416 x r.p.m.

However, this procedure is rathe long for each and every operate that has to be calculated. The fil lowing formula will produce the ser

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THE NATIONAL ACME COMPANY CLEVELAND, ONIO SHEET NO. ORDER NO. DATE. MACH. SIZE 1-1/4" RA-O Acme-Gridley PER MR. MATERIAL SAE-1112 C.D. Steel
1 diameter round. NAME OF PIECE ..... MACH. TIME MIN. 10.75EC. GROSS PROD. 336 PER HR. CONSTANT SPEED. 1759 R P M. SPINDLE SPEED. 917. R P M. 162 ET. SPINDLE GEARS. 32-44 LOW FRIED FEED GEARS. 60-40-44-56 16:60 11/16 1 Dia. 5/32" ...0017" 1/8" ...0012" 6 POS. CAM ..... ....0013" 1/32×45 1 1/4" ....0027" -.720 4 \*\*\*\* 13/8 @•0081" 3/4" TOOL SLIDE .... SCALE Six - 1" Dia. round collets Six - 1" Dia. round pushers 6th position Six - 1 Dia. round spool bushings One - D.D.Cir. form tool holder Rough form .150" One - Circular forming tool Spot drill One - 1" diameter drill One - Drill bushing lat position One - Dovetail form tool holder Finish form .105" One - Dovetail forming tool Drill •720" One - 47/64" drill One - Drill bushing Face end One - Knee turner 2nd position One - High speed drilling attach. ·750" One - Drive unit One - 1/2" drill Drill One - Drill bushing 3rd position One - Shaving fixture •190" One - Shaving tool Shawa Counterbore One - Roll rest Ream One - Combined reamer & counterbore One - Floating bushing 4th position One - Universal threading attach. One - Releasing type tap holder One - 13/16"-24 tap Tap in .375" One - Lead cam One - guard cam One - Return oam One - Bushing 5th position One - Cutoff tool holder Cutoff .125" One - Cutoff tool SUBSEQUENT OPER.

Fig. 1—Tooling Layout and Set-Up Chart for Making Spark Plug Shells on 11/4-Inch RA-6-Spindle Acme-Gridley Automatic Machine

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Having the answer, then, from the change gear chart furnished with the machine upon which the job is to be done, the change gears are selected that will produce the speed nearest to the figures.

#### Selecting Cams

Before the production speed can be estimated, it is necessary to determine the sizes of the cams for each of the slides. To obtain the best possible production, a selection is made of the shortest cams that can be used on each operation. In other words, the operations are divided so that the tools will have the shortest possible travel, keeping in mind that all cams should start and finish their respective tool travel simultaneously.

As in the case of tool selection, the choice of cams is governed to a great extent by the character of the work and the set-up man's experiences with feeds that can safely be applied to the tools on different materials.

At this point it may be well to check whether or not the operations have been divided to the best advantage and so that the time required for the operation will be limited to that required for the longest single cut.

After determining these two figures—(a) the distance each tool will travel and (b) the feed for each type of tool—the number of revolutions of the work necessary to complete each cut can be found. In the tooling chart illustrated, the cams used on the sixth, first, and third positions control forming tools.

For a recommended feed of 0.003 inch, the 4-inch cam requires 52 revolutions, the 1/8-inch cam requires 41 revolutions, and the 1/4-inch cam requires 83 revolutions. The end tool-

slide %-inch cam at 0.008 inch feel requires 94 revolutions. It is evident that the drilling is the longest operation, and since five of the six end toolslide positions are in use, it is impossible to reduce the number of revolutions required by further dividing the cuts.

It should be noted that the came for the side slide positions are shown as producing feeds lower than the feeds that could be used. This is due to the fact that the longest operation always determines the number of spindle revolutions required, irrespective of the feeds the tools are engaged. The use of the following formula will make it possible to find the feeds at which the side slide tools on the job will cut:

#### Tool travel

-Feed of tool

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December

Number of Revolutions or, for the third position \(^1\)4-inch came, \(0.250\)

= 0.0027 inch feed. This same 94

method is used to find the feed on tools controlled by the \(\frac{1}{6}\)-inch and \(\frac{1}{2}\)-inch cams.

#### Selecting Feed Change Gears

Next in order is the selection of the proper feed change gears. Most feel change gear charts for an automatic multiple-spindle machine refer to end toolslide cams. Thus, if the end toolslide operation requires the greatest number of operations, the desired feel is found under the cam size on the change gear chart and the feed gears required will be found opposite the feed in the columns under gears.

If the operation requiring the greatest number of revolutions to complete the cut is performed on one of the side toolslides, it is necessary to calculate the true end toolslide feed in relation to the toolslide feed in order to determine what feel change gears to use. This is accom-

THE NATIONAL ACME COMPANY CLEVELAND, ONIO SHEET NO.\_ CUSTOMER ... .....ORDER NO.... DATE. MACH. SIZE 11-R-6 ADDRESS DRAW NO. SAE NAME OF PIECE .... GROSS PROD. 1028 PER HR. X-1112 CR MATERIAL SAE A-100ND STEEL 11/32 ROUND MACH. TIME MIN. 32 SEC. CONSTANT SPEED 1750
SPINDLE SPEED 2370 R FEED GEARS 60-40-36-44 6 POS. CAM. 1/8 1 " 1/8 .0022 344 DIA. X I" LONG •.0022 3 ... 5/16 • .0055 4 .. SCALE TOOL SLIDE. 1 SET 11/32 RD. COLLETS PUSHERS & SPOOL BUSHINGS ROUGH FORM 1 D.D. CIRC. FORM TOOL HOLDER SPOT 1 TOOL BLOCK 1 RATCHET 2 PINS 1 CIRC. FORM TOOL 1 CIRC. FORM TOOL BOLT FINISH FORM 1 DRILL BUSHING SUPPORT 1 DRILL 2 " 1 DOVETAIL FORM TOOL HOLDER 1 DOVETAIL FORM TOOL 1 BUSHING 1 WATSON TURNER NO. D-1 TURN 1 BUSHING 1 KNURLING FIXTURE 1 KNURL - K 5 S 20 1 DRILL CHUCK KNURL 1 No. 6 WIRE DRILL DRILL 1 FLAT FORM TOOL HOLDER FACE 1 FLAT FACE TOOL & SUPPORT 1 ROLLER SUPPORT 1 SHAVING FIXTURE 1 SHAVING TOOL SHAVE 1 SHAVING TOOL REST STELLITE TIPPED 1 SHAVING TOOL ROLL SUPPORT 1 PIN 1 SUPPORT 1 INDEPENDENT SLIDE ASSEM. **CUT OFF** 1 SLIDE SUBSEQUENT OPER. SIGNED .....

Fig. 2—Tooling Layout and Set-Up Chart for Steel Inserts. This Job is Done in 3½ Seconds

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plished by application of the formula. Size of end toolslide cam

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Side toolslide travel slide feed = end toolslide feed. Having the revised end toolslide feed, by proceeding as above it will be possible to determine the feed change gears to be used.

#### **Production Formula**

Having determined the longest operation and the number of revolutions required and the spindle speed at which the job is to be run, production speed is found by application of the following formula:

Number of Revolutions Required X 60 (sec.)

\_\_\_\_\_\_Time in Seconds

Revolutions per Min.

for actual machine operations.

The machine time equals the time required for the machine operations plus the idle time of the machine; therefore in the tooling layout illustration the longest operation (on the end toolslide) has a travel of ¾ inch at 0.0081 inch feed, which requires about 94 revolutions. The spindle speed is 617 r.p.m. Applying the formula above:

94 x 60

= 10.7 seconds machine time

for completing the spark plug shell.

## Figuring Tapping and Threading Time

In tapping and threading, no definite threading speed can be used as the type of material and size of the thread in many cases determine the speed. Usually a speed of 25 to 30 feet per minute is used when working steels, and speeds of 50 to 100 feet can be used on brass.

Most multiple spindle automatics are made to provide a threading speed ratio of 1/3 to 1/5 of the spindle speed when working the smaller sizes,

and from 1/5 to 1/7 of the spinds speed on the larger sizes, with 1 ratio of  $1\frac{1}{2}$  to 1 for returning 0 backing off. In order to tap 0 thread on an automatic and have the tap or die both thread and back off the threading spindle is rotated faste either or slower than the work spindle in the same direction.

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If the work spindle is revolving at a given speed and a right-hand tal enters the hole to be tapped at a speed slower than that of the work spindle, the tap will pull itself in and cut the thread. When the tap has penetrated to the required depth the threading spindle is made to revolve faster than the work spindle and thus the tap is actually backed out of the work while both tap and work an revolving in the same direction. For left-hand threads, the threading spindle must revolve faster than the work spindle while threading and slower than the work spindle to back the tap out.

The time required for tapping of threading can be found by following this method: Work Spindle Speed In Threading Speed Ratio = Actual Threading Speed in R.P.M. The less on the tap is found by figuring 1% to 2 threads in addition to the actual number of threads to be cut.

The formula for threading time is Number of Threads x 60 (sec.)

Actual Threading Speed R.P.M.
Threading Time in Seconds

In a case where a solid tap or dist to be used for tapping or threshing, where the tap or die must be all out of or off from the work, it is necessary to figure the time for feeing onto or into the work and the for backing out or off, and add the two together. But in figuring a threading or tapping job where a set opening die head or collapsible to be used, it is only necessary to figure the time for tapping or threshing or threshing or tapping or threshing the same and the same an

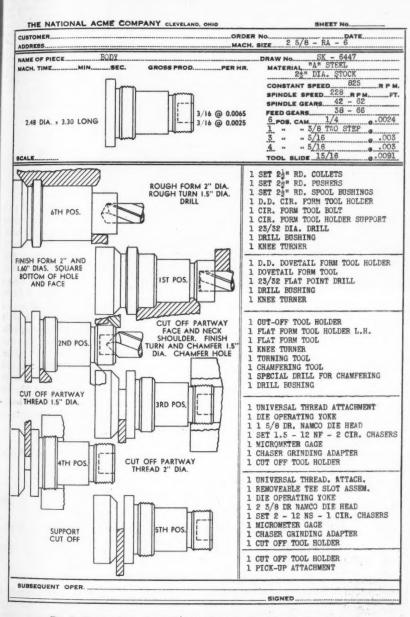


Fig. 3—Tooling Layout and Set-Up Chart for Steel Spark Plug Body

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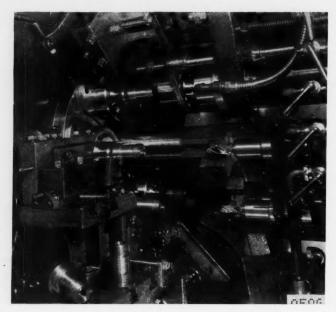


Fig. 4-View of Me chine after Being & Up According to the Tooling Layout P sented in Fig. 3. Tools Used in First Position will Seen in the Low Part of the Pictu the Second Positi Tools in the Cand the Third

tion Tools in the Upper Portion

ing the piece; no time needs to be allowed for backing the tool off or out.

When the tapping or threading operation is the longest operation in the cycle, to the tapping or threading time must be added the idle time of the machine in order to obtain the machine time and production per hour. Where a solid die or tap is used, a second or two is allowed for the reversing clutches to work and for the die slide to be brought back to starting position.

OR 3 DAYS

In the spark plug shell tooling layout, a 18-inch. 24-thread tap is used to tap a hole %-inch deep. Let us assume that this hole is to be

tapped at a work spindle speed of 617 r.p.m. A depth of % inch on a 24-thread tap requires 9 threads; adding 2 threads for lead on the tap makes a total of 11 threads to figure. Gear ratio charts for this machine show threading speed ratios to be 0.233 for slow right hand, 0.353 for fast right hand, and 1.543 for backing out or off. The following formula is applied:

11 Threads x 60 (Seconds)

= 4.6 Sec-0.233 x 617 R.P.M. onds for Slow Right Hand, or 11 Threads x 60 (Seconds)

3.02 0.353 x 617 R.P.M. Seconds for Fast Right Hand, plus 11 Threads x 60 (Seconds)

0.543 x 617 R.P.M. Seconds for Backing Off.

Then 4.6 seconds plus 1.97 seconds = 6:57 or approximately 7 seconds tapping time using slow tapping gears,

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1.97

# 30 WAYS to Save Money!

HERE are 30 different types of Haskins Flexible Shaft Equipment. With direct and multi-speed countershaft drives. With pedestal, bench, truck and ceiling-suspended mountings. With motor ratings from 1/4 to 11/2 HP. Types to do all kinds of grinding, sanding, filing, wire-brushing and polishing jobs faster and more

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economically than they've ever been done before!

If there's work of this kind to be done in your plant, why not do it the money-saving Haskins way? Why not look into this really complete line of Flexible Shaft equipment now when stepped-up production and helddown costs are the order of the day? Catalog No. 45 illustrates and gives specifications for the entire line. It's free - write for it. R. G. Haskins Company, 619 S. California Avenue, Chicago.



Haskins Flexible Shaft Equipment Type RG-5 for heavy duty sanding, grinding and polishing operations. <sup>3</sup>/<sub>4</sub> HP ball bearing motor delivers <sup>34</sup>/<sub>25</sub> RPM through a direct drive. Accurately ground tapered core ends are employed at the motor end to insure long life and to hold core vibration to a

Haskins Flexible Shaft Equipment Type HS-4 for general die shop work where portability is important. Timken bearing countershaft with six speeds up to 7500 RPM. ½ HP ball bearing motor. Full ball bearing spindle adapted to use true running taper shanks.



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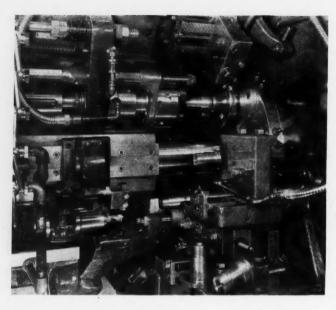


Fig. 9 — Shown Hers are the Tools Employed in the Sixth Position, Fig. 7, Which can be Seen in the Lower Part of the Picture, the Fifth Poistton Tools in the Center, and the Fourth Position Tools in the Upper Portion in the Upper Portion

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#### Toolholders

Although the cutting tools for each job have to be made to fit the

job, the toolholders can be used or many jobs and thus can be standardized. For instance, if a circular form tool is used in any one position, frequently the tool block and tool block holder can be made so that they can be used on a variety of jobs. Holders for dovetail vertical form tools can be standardized; one for wide forming tools and one for narrow tools. With flat forming tools and cut off tool holders the same holds true. This will save making a great number of holders, besides which gauges can be

and 3.02 seconds plus 1.97 seconds = 4.99 or say 5 seconds tapping time using fast tapping gears.

Due to the material and depth of the cut, it is advisable to base an estimate on the slower threading speed, which gives 143 r.p.m. or approximately 30 surface feet per minute on the tap while the fast threading speed provides 218 r.p.m. or approximately 45 surface feet per minute.

The surface speed on a tap or die should be within the limits recom-

# INSPECT Internal Surfaces, Recesses and Hidden Contours

Also direct vision, retrospective and foroblique systems.

120



WAPPLER Industrial Telescope

Illustration above shows right angle vision possible with the Type "A" telescope.

Perhaps we can solve your inspection difficulties. Send us a blueprint with details of your particular problem.

WRITE TO INDUSTRIAL DIVISION FOR CATALOG.

American Cystoscope Makers, Inc., 1241 Lafayette Ave., New York, N. Y

# When You Have to Contend with Abrasion, Heat, and Corrosion

# Use Haynes Stellite Alloy Specialties

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Aunique combination of properties makes Haynes Stellite alloy the outstanding material for applications where high resistance to abrasion, heat, or corrosion is required. This is true because:

Haynes Stellite alloy is inherently hard and abrasionmistant—even at red heat.

It is extremely resistant to atmospheric corrosion, and resists the action of many common corrosive agents.

It is practically non-magnetic.
 It takes an extremely high polish.

It has a low coefficient of friction.

You can obtain Haynes Stellite alloy specialties cast and finished to your specifications. Let us help you investigate the advantages of using Haynes Stellite alloy specialties in your business. Write the nearest district office, without obligation.

HAYNES STELLITE COMPANY
Unit of Union Carbide and Carbon Corporation
New York, N. Y. The Kokomo, Indiana
Chicago-Cleveland-Detroit-Houston
Los Angeles—San Francisco—Tulsa



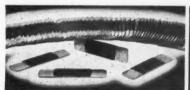




Automotive — Haynes Stellite alloy plunger lever pins for diesel engine fuel pumps resist corrosion. Electrical — This solid die, economically used in the manufacture of electrical products, weighs 10 lbs.



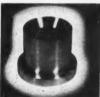
Petroleum – Pump rods are made by butt-welding steel or nickel alloy ends to the Haynes Stellite alloy center, where abrasive and corrosive action occurs.





Rubber – These rubber cutter knives are made from a malleable grade of Haynes Stellite alloy.

Machinery - Haynes Stellite metal-cutting tools have red hardness and high cutting quality.



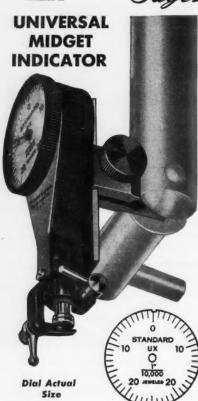


Valves — This seat ring for an "anti-coking valve" withstands heat, abrasion, and corrosion.

Chemicals — Haynes Stellite alloy battery mix knife parts resist abrasion and chemical corrosion.

Red-hard, wear-resisting alloy of cobalt, chromium, and tungsten.





THE UNIVERSAL MIDGET INDICATOR contains a completely geared and fully jeweled mechanism, without cams or levers. .0001" is read on the dial.

#### STANDARD GAGE CO., Inc.

75 Parker Avenue POUGHKEEPSIE, N. Y.

used to facilitate the task of making them. Roll turner frames, as well as roll rest frames, can also be standardized.

Due to the care taken in the designing of the multiple spindle automatic machine to make it as flexible as possible, it is surprising to find the many kinds of operations that can be performed without the necessity of providing special attachments.

High speed drilling and threading attachments have been standardized so that they can be used on any size machine of a given make, thus making them interchangeable when occasion demands. Also, the speeds are such that the attachment will take care of 90 per cent of all jobs allotto the machine without changing driving speeds, although they can be changed to accommodate the other 100 per cent when necessary.

Firthite New Standard Tool Tip Size and Price List. A 12-page bulletin containing descriptive and tabular information, including prices, on the new standard sizes of Firthite Sintered Carbide Tool Tips has been prepared by the Firth-Sterling Steel Co. McKesport, Pa. The bulletin also includes information on non-standard tips and Firthite Sintered Carbide Blanks. Copy free upon request.

"Air Reduction — A Quarter Century of Progress" is the title of a 54-page plastic bound catalog now being distributed by the Air Reduction Co., Inc., 60 E. 42nd St., New York, N. Y., giving a brief history of the organization and growth of Air Reduction and the various subsidiary companies that make up Air Reduction Co., Inc. The catalog is profusely illustrated and has been designed to give a quick overall picture of the products produced by Air Reduction and its subsidiary companies and the use of these products in industry and defense.

Of particular interest is a chart at the rear of the catalog which graphically illustrates the many markets to which Air Reduction's products are distributed. Copy of catalog free to mechanical executives upon request.

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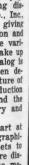
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Sheffield Gages utilizing the Reed Mechanism—notably the Multichek Electrigage and the Visual Gage, used in checking dimensions of manufactured and purchased parts, tools, production and master gages.

The action of the Reed Mechanism is instantaneous and always absolutely positive. The Reed Mechanism employs no gears, knife edges or levers and there are no rubbing contacts in its action. It is never subject to frictional wear. The use of this mechanism makes Sheffield Gages the most rapid precision instruments available.

If you are engaged in peace time production or national defense work, write for descriptive data on Sheffield Gages.





The Motorized tester is intended only for quantity inspection testing of small or other parts easily positioned.

# "ROCKWELL" Motorized, HARDNESS TESTER

WILSON
MECHANICAL INSTRUMENT CO. INC
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December, 1941 December



The "Superficial" type applies special light loads for the testing of thin sheet metal.

# ROCKWELL" Superficial

, 1941 December, 1941

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co. inc.

### WILSON

Concord Ave. & 143rd St.
New York

MODERN MACHINE SHOP

# Safety Congress Launches Campaign Against Carelesness

A CCIDENTS which kill or disable workmen are increasing at an alarming rate in practically every field of industrial activity, according to reports made at the 30th annual National Safety Congress in Chicago, October 6th to 10th.

Col. John Stillwell, New York electric utility executive and president of the National Safety Council, in his opening address at the convention, revealed that from Jan. 1 to Sept. 1 of 1941 industrial accidental deaths are up 6 per cent over 1940; deaths on streets and highways up 18 per cent; and all accidental deaths are higher by 3 per cent.

"We must contemplate, then," said Col. Stillwell, "a possible accidental death toll for the entire year of 100,000 lives, or 3,500 more than were lost in 1940. The probable economic losses will be some \$3,600,000,000. This situation is largely responsible for the slowing up of our defense preparations."

Secretary of the Navy Knox in a later address before the convention interpreted the facts further in pointing out that strikes in defense industries in 1940 caused the loss of 6,700,000 days of work, but that accidents cost 26,800,000 days or four times as much lost time. This, he asserted, would have been "sufficient to build 45 battleships, or 375 destroyers, or 450 submarines, 195,000 light tanks, 12,500 trainer planes, 75,000

fighter planes, 30,000 medium bomb ers or 15,000 heavy bombers."

Col. Stillwell proposed a threpoint program to curb accidents this to include organization of public support in an "Enlist for Safety campaign; a study of new emergency problems to discover and apply appropriate remedies; and "mobilization of all our strength to defeat the steady pressure for diversion of safety budgets and manpower to other uses."

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"We know," said Col. Stillwell "that skilled workers anywhere in the vast scheme of defense who are killed or disabled by accidents cannot be replaced. We know that any 'economy' achieved through cutting safety expenditures is, in reality, the wors kind of extravagance. We must unceasingly drive home this clear and vital fact to all industrialists, legislators, and administrators."

Accident prevention in the moder machine shop was discussed from many angles by outstanding special ists in safety engineering who appeared before various sectional meetings of the five-day conference.

Speaking on the topic "Safety and Design in Hydraulic Controls," F. L. Macklin, superintendent of machine shop, General Motors Institute, Flint. Mich., declared that greater attention should be given to safe design and installation of machine tools which are vital to the national defense pro-

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## MASONITE DIE STOCK

Helps Answer America's **Need for Speed** 

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DAY BY DAY, America moves forward in its speed-up production of aircraft - thanks, in no small measure, to the new and improved Masonite Die Stock. This semiplastic material has kept pace with the needs of aircraft builders for high production runs at high speeds through constant improvements. Today-Masonite Die Stock is being widely used by airplane builders in the manufacture of dies for shearing, forming and spinning sheet metal, especially aluminum alloys.

Only about one-sixth the weight of steel . . . easily produced in the pattern shop with high-speed woodworking tools . . . dies made of Masonite Die Stock are also being welcomed today into many other



Masonite form block used in construction of wing spars at Bell Aircraft Corporation.

industries that work with thin gauges of stainless steel, body steel and aluminum or magnesium allovs, in sheet form.

Masonite Die Stock is durable and inexpensive, whether you use it for tooling small experimental runs or a large production job. It will help you do a faster, better job at lower cost.

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December, 1941

MODERN MACHINE SHOP

gram and that responsibility for accidents to costly machine tools and workers who operate them should be laid on the shoulders of machine designers and industrial safety engineers who permit installation of unsafe machines.

"Any designer who fails to design into the machine or fixture all the necessary safety devices is responsible for any accident that may occur," said Mr. Macklin. "And any safety engineer who allows an unsafe machine or fixture to be put into use is more negligent than the designer. There is need for close cooperation between designer and safety engineer so that the knowledge of both will be used to eliminate all preventable accidents."

Mr. Macklin discussed the types of control mechanisms for machine tools and recommended hydraulic controls or combination hydraulic and electric controls. All controls should be placed within easy reach of the operator, he said, and in such a manner that he can reach it without unnatural movement.

Joseph I. Karash, safety engineer for the Reliance Electric and Engineering Co., Cleveland, O., in addressing the Power Press Section of the Congress, described a power press which was designed primarily for safety but which has resulted also in greatly increased efficiency.

"The real solution to the safety problem encountered in power press machines," said Mr. Karash, "is to make it unnecessary for the operator to put his hands in the danger zone—between the two moving parts of the die. In the inclinable press, gravity relieves the operator of many of his previous duties. The stock moves into place by gravity. The worker merely guides it, and his hands do not come between the moving parts. The finished work slides into receptacles by gravity; thus the work is not required to remove it."

Outlining a method for coordinating machine speed to the most efficient tempo of the operator, he said "In most cases the machine's top speed will be too great for the operator, except for short spurts. Best results are usually obtained by slowing the machine to a speed suited to the individual tempo of the operator. He can then guide the material through the dies without fatigue and the maximum production of man and machine will result."

Mr. Karash advocated the use of screens, swinging guards and roped bracelets wherever the worker is not completely safeguarded by his machine's design.

A heavy responsibility rests upon the set-up man who installs powerpress machinery, declared F. E. Frederick, safety director for the International Business Machines Corp., North Endicott, N. Y. The set-up man he emphasized, should combine most of the qualifications of a good machinist and tool maker, an executive who can obtain cooperation of other workers and a safety engineer. Proper installation, he insisted, is not only necessary for safety in the factory but for its efficient operation. For the best safety record, he added, good installation should be followed by frequent inspection and thorough maintenance.

R. J. Greenly, chief of the training division of Carnegie-Illinois Steel Corp., Pittsburgh, Pa., laid responsibility for the recent sharp rise in industrial accidents to new, inexperienced workers, rushed into factories without adequate training. Accident rates during the first year of employment, he said, are usually twice the rates in subsequent years.

"Substantial results can be obtained," said Mr. Greenly, "from concentrating safety promotion work among this high-accident group of new and inexperienced workers who have deficient knowledge of safe practices and lack skill."

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# **BOUT** of the

AIR VS. HIGH-CYCLE GRINDERS

# HIGH-CYCLE WINS ROUND 1

SET-UP:

At Pressed & Welded Steel Products Co., Long Island City, N.Y. Needed four more portable tools - grinders and sanders. Short of air supply. Should it be AIR or HIGH-CYCLE? The Rotor Analyst recommended HIGH-

CYCLE. The results:

HIGH-CYCLE defeats AIR in this plant with these three telling blows!

- Gives 25% FASTER production. On this job, higher speed under load with HIGH-CYCLE produces 25% to 30% more work per hour than with AIR tools.
  - Saves \$1695 in first cost. Air compressor would have cost \$2632. Frequency converter for HIGH-CYCLE cost only
    - Cuts power bill \$725 per year. \$937. Saves 48.5 B.H.P. or 36.2 K.W. At 1c per K.W.H., that's \$725 per 250-day year on full load basis.

WHAT WOULD BE THE SCORE IN YOUR PLANT?

Why not let the Rotor Analyst stage and referee the bout of AIR and HIGH-CYCLE in your"ring"-to find out definitely which type of tool can turn out most work under your set-up and give you greatest savings. No obligation.

The Rotor Analyst has 65 different AIR tools and 59 different HIGH-CYCLE tools with which to solve your problems.

THE ROTOR TOO!

CLEVELAND, OHIO

UNBIASED ANALYSIS OF PORTABLE TOOL PROBLEMS





In spite of all the safety engineer's efforts to install safe equipment and safeguard its danger spots, he said, unskilled and untrained workers will find ways to outwit the safety device and become a victim of their own machines.

"Too often," he continued, "they regard it as 'sissy stuff'-a sort of industrial Sunday school where the usual safety slogans are chanted, after which the worker can return to his previous unsafe practices with his soul at peace. Safety training should thus begin at the applicant's first contact with the plant. The training should be repetitive and as near continuous as it is practical to be. For best results it should be given right on the job-at the machine where the man works for eight hours each day. Subsequent training in groups should be stimulating and not boring. New employees CAN easily and quickly be taught safe habits if appropriate,

concentrated effort is directed ton that end."

Discussing foreman training, V Perry, director of training for An ican Rolling Mills Co., Middleto O., declared that the foreman widepartment shows the best saf record is the one who substite diplomacy and thoughtfulness roughshod authority and who sethings done because he sees the of fellow's point of view rather than cause he has the authority to on things done.

P. C. Kauffman, superintendent safety and welfare for Jones Laughlin Steel Corp., Pittsburgh, I placed responsibility for safety of workers upon the top management

"Management," said Mr. Kauffm
"has a moral and an economic
sponsibility to the man in the pla
A man should leave his day's work
the same healthful condition in wh
he arrived at work. Management

### "Accurate Engraving With Unskilled Operators Engrave Iron, Soft Steel, Copper, Brass Aluminum, Plastics on the Auto-Engrave



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COMPA YORK, I

mber, in December, 1941



- - hour after hour, night and day, workheads are spinning for defense. For the vital tools at these workheads, you cannot set your quality standards too high.

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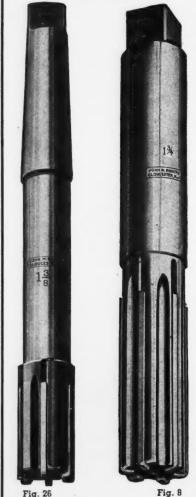
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### ROGERS

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High Speed Blades. Adjustable for Wear. Deliveries Good.

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GLOUCESTER CITY NEW JERSEY

should see that every effort is forth to use improved methods, m ods that will make man the mast his machine so that his health body will be better for its use,

"Probably more men are hurt to using the wrong method than by other cause. Machines usually well guarded, safety clothing is vided, but one frequently finds a error in method, either on the tof the worker, or the supervix staff."

Management's prime responsibilities. Mr. Kauffman declared, "is to reat the possibilities for accidents the exist in mill, factory or office, a recognize also the limits of his behavior. Then, giving these fat their proper consideration, plants to be formulated and executed guard the unguarded hazard and unguarded mind."

A well developed safety prograte he pointed out, "is likely to require the expenditure of some money in moving physical hazards, installisafety appliances and employing corps of safety engineers and and antitude in its financing of the safe department is perhaps the best management has to show its cerity towards safety for the aployees... Accidents are expension."

They destroy manpower—as vital the most modern machine in the days of emergency production."

Vascoloy-Ramet Tantalum-Tung Carbide Tools and Blanks are the ject of a 28-page general catalog price list prepared by the Vasco Ramet Corp., North Chicago, Ill. catalog lists 22 typical styles of valoy-Ramet single point tools, togularly with a grade selector chart giving commended uses for the various goof Vascoloy-Ramet. Also included instructions for ordering tools blanks, as well as tables for coming costs of standard tools and bland special blanks. Copy free upon quest.

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RAPID PRODUCTION

Today many manufacturers must make the most of their present equipment. To owners of LeBlond machine tools, we offer valuable information on (1) servicing LeBlond lathes and cutter grinders for longer effective life, and (2) accessories for greater versatility and productive capacity.

Tomorrow many manufacturers will need to modernize their plant equipment. Production-wise executives are planning ahead. And here again LeBlond is at your service. Why not write us today? Simply address

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GUN MANUFACTURING LATHES CUTTER

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### LET PERFORMANCE



At the plant of a manufacturer 240 cl speed steel taps ground every ho Landis 4" Type H chine. Limits on this part are .007" stock is removed. The finis than required.

A large corporation is using a Landis 4" Type H Plain for grinding the undercut on the end of an airplane valve stem. In spite of the fact that the stems are hollow and the steel is unusually tough, 68 are ground per hour with .050" to .055" stock removed.







A Syracuse, New York, company is grinding pipe taps on a Landis 4" Type H Plain ma-chine. Although these taps are made of high speed steel and although .110" stock is removed in the grinding operation the machine grinds both ends, illustrated, at the rate of 20 taps per hour.



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### NUELL THE STORY





Inner ball bearing raceways like the one illustrated at left are being ground on a Landis 4" Type H Plain in the plant of a well-known ball bearing manufacturer. The machine

grinds 130 per hour within limits of .0002" concentricity and .0005" diameter. Stock removal is .005".

Chuck jaws such as the one shown at right are ground on a Landis 4"
Type H Plain Hydraulic Grinder in the plant of a large chuck manufacturing company. With the use of a work holding fixture 250 of these jaws. 2005", stock removal is .006".



We <u>could</u> tell you all about the many new and important design features of this modern Landis grinder, the 4" Type H Pain Hydraulic.

Type H

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We <u>could</u> tell you in great detail about he way it has filled the demand for a peedy machine of small swing.

All this may or may not be of interest to ou. But if you are as busy as most execuives the one thing of great importance to you and the first thing you would probably ask is—"What Is It Doing On The Production Line?"

Gathered on these pages are six producion reports from manufacturing plants broughout the country. Read them.

Then you will agree that performance like this warrants your attention and inrestigation. And if you would also like to know about the new and highly important design features that make such performance possible—just send for Catalog No. A-41 to the Landis Tool Company, Waynesboro, Pa.



OLOMPANY

WAYNESBORO PENNSYLVANIA

### Civilian Defense Duties and Insignia

THE Office of Civilian Defense has released illustrations and specifications of dimensions, colors, and materials for 16 different insignia for enrolled volunteer civilian defense workers. Each of the activities in civilian defense, 15 in number, will have a distinctive design which the volunteer workers, after they have been enrolled and trained, will wear on white armbands or embroidered on the left sleeve of uniforms, one inch below the shoulder seam.

The sixteenth design is the basic insigne bearing the initials "CD" (Civilian Defense) in red, enclosed in a white triangle which is superimposed on a circular blue field. This basic insigne will be worn on cap and uniform collar ornaments of all civilian defense workers.

The designs are executed in modern and dramatic simplicity. A single flame designates fire watchers; a ladder, rescue parties; a steering wheel, drivers corps. A flash of lightning symbolizes speed for messenger service. A drinking cup, a shovel, and a diving plane graphically indicate. respectively, emergency feeding, road repair, and All designs were tested, scientifically, for visibility under varying conditions, and for recognizance values.

The 16 designs have been patented by the Office of Civilian Defense.

Only manufacturers who are license by that organization will be permit ted to fabricate or use any of the insignia in any manner. by licensed manufacturers of office ing the insignia will be limited to designate civilian defense councils.

Only enrolled civilian workers are entitled to wear any the insignia as part of uniforms on clothing in any way which would exactly simulate official wear. This restric tion applies to use as any, part of clothing, caps, or hats. There is memmend restriction on the use of insignia of novelties, such as costume jewelry belt buckles, cigarette cases, hand kerchiefs, scarves, pocketbooks, etc. Lapel buttons, either for use of civilian coats, in the same manner a the American Legion button, or sim ilar buttons, made with a safety pi catch for ladies, definitely com under restricted use by enrolled workers. The insignia used as par of the design of a woman's brooch however, could be worn by anyone.

Civilian defense workers or their defense councils throughout the country will pay for all insignis themselves with the possible exception of the official armbands Congress has been asked to authorize sufficient funds to distribute the latter.

The OCD is preparing a list manufacturers who have been l

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of officia ing the more-than-fifteen years in which Ross has supplying Industry with sturdy control valves for defens wkind of air actuated equipment, there has been no le instance where Ross Engineers failed to produce exactly correct, dependable control for the specific ... This Engineering Staff is ready at all times to mmend the standard or special Ross Valve best suited our individual requirements.

Bring your air control problems to Ross.



DETROIT, MICHIGAN

A SIZE IECHANICAL PILOT CONTROL

censed to fabricate the insignia on armbands made of cloth, and collar and cap made either of metal or embroidered cloth. The metal ornaments will be enameled in red, white and blue on gold. The embroidered emblems will employ the same colors without gold.

Optional choice between metal and embroidered insignia is given to defense worker groups when they purchase. Other official—though not required—use of insignia is confined to automobile plates and flags or banners. The basic insigne only may be used on automobile plates.

On banners, the addition of gold stars in the number requisite to designate rank is permitted. Banners bearing group insignia will be restricted to appropriate use by the

groups so designated.

Designations of rank are made in a military manner differing from either the Army or Navy. Black triangles indicate the lesser ranks; one black triangle designates "worker, 1st class"; two black triangles, "squad leader"; three black triangles, "section leader." These triangles will be worn directly beneath the basic insignia on armbands or shoulder ornaments.

One silver pyramid denotes "captain of wardens" or "assistant to chief" or "zone leader"; two silver pyramids designate "chief of local group" (wardens, etc.); three silver pyramids indicate "chief of service" (fire, police, etc., local or state).

One gold star indicates "local coordinator of civilian defense"; two gold stars, "state coordinator of civilian defense"; three gold stars, "regional director of civilian defense" (or principal assistants to U. D. Director); four gold stars, "United States Director of Civilian Defense (Mayor F. H. LaGuardia).

Insignia of rank, with the exception of black triangles, will be worn on the lower sleeve in a vertical a starting four inches from the both of the cuff and spaced at intenof one inch on both sleeves

Each official or semi-official us insignia has definite designated mensions. Armbands will be a inches deep and the insignia on a bands, or sewn on the upper sleeves of uniform, will be a inches in diameter. Collar and ornaments will be 1½ inches diameter and the former will be mon both uniform laps. Stars a be one-half inch diameter at a points.

Lapel buttons for men and pins women will be one-half inch diams and must be worn in the button of the left lapel or pinned over left breast. Automobile insig (confined to cars or trucks employ in civilian defense) must come will diameters of 4 to 12 inches. The emblems may be painted or ename

On helmets the basic insigniand be painted or stenciled the same as as other headgear ornaments—linch. The lapel buttons or pinsion use on civilian clothing may emplall of the various official insignibut are restricted to use by end but are restricted to use by end in three colors on gold like collars cap ornaments, and are limited to inch diameter.

Only armbands are prescribed obligatory for use by defense works Collar and cap ornaments, should insignia for uniforms, and lap buttons for civilian dress are recommended, and their use will be recognized as official, although a demanded. Such use, like the weard of uniforms, is strongly recommend to defense councils who can sent the funds from civilian defense workers or other sources to prost them.

Flags and banners for decorate purposes are not restricted, but a

MODERN MACHINE SHOP

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December, Macember,

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- 1. Reduced wheel loading and glazing
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100% grinding efficiency is best accomplished by careful consideration of the grinding fluid factor. The vital part which a prop-

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limited to the use of the basic insigne. There are no prescriptions for the size of banners. The civilian defense groups for which individual insignia have been created are:

Air Raid Warden
Auxiliary Police
Bomb Squad
Auxiliary Fireman
Fire watcher
Rescue Party
Medical Corps
Nurses' Aides Corps
Messenger
Drivers Corps

Emergency Food and Housing Demolition and Clearance Crew Road Repair Crew Decontamination Corps Staff Corps (basic insigne)

Basic

Manufacturers who may desire fabricate official or semi-official signia, or to incorporate any of insignia in the design of any nove articles, should apply for a license the Office of Civilian Defendance of the Manufacture of the Manufacture

#### Insignia of Enrolled Volunteer Worker Groups

Civilian Defense. The basic emblem of Civilian Defense consists of the initials CD in red, set in a white triangle within a blue circle. The basic insigne may be worn by all enrolled Civilian Defense workers. It is the only symbol allowed for use on headgear. For uniformed groups only it may be worn on the lapels of uniform coats.

Air Raid Warden. Insigne; a red and white striped triangle set in a blue circle. Though he does not have police powers, the Air Raid Warden usually works closely with the police. His duties include (1) watching for lights during a blackout and warning offenders, (2) directing persons in the street to shelter, (3) reporting fallen bombs to the control center, (4) detecting and reporting the presence of gas, (5) administering elementary first aid, and (6) reporting fires and assisting in fighting incendiary bombs.

Auxiliary Fireman. Insigne; a maltese cross in red within a white triangle set in a blue circle. Because numerous fires can start simultaneously and spread swiftly during or after a raid, it is necessary to augment the regular fire-fighting forces. Auxiliary fire stations with an officer or first grade fireman will be established around each existing engine company, and enrolled volunteers will be assigned to each station.

Auxiliary Police. Insigne; a red shin within a white triangle set in a blue and Auxiliary Police may be called upon aid in enforcement of emergency retitions on lighting and trespassing guard docks, bridges and factoring against sabotage, or to guard against sabotage, or to such a shops.

Bomb Squad. Insigne; a red diving a plane in a white triangle within a blacircle. Bombs which have failed to a plode or have delayed-action fises must be removed as soon as possible to plow where they can be exploded without a third triangle falls to a group of men from the regular police force whave been carefully trained for this wat

Decontamination Corps. Insigne; and chemical retort in a white triangle si within a blue circle. This group applie the chemicals which are used to neutralize poisonous gases and liquids, either a clothing and equipment or in the street and on walls contaminated by poisonous gases.

Demolition and Clearance Crew. It signe; a pick in red within a white the angle set in a blue circle. The task of this crew is to assist the regular municipal clearance forces in removing rubble glass, and other debris from streets on buildings after an air raid.

Drivers Corps. Insigne; a red steem wheel in a white triangle set in a blu circle. Persons willing to offer their am

ENEXCY FOOD

#### Basic and Armband Insignia for Enrolled Volunteer Workers in Civilian Defense

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AIR RAID WARDEN



BASIC INSIGNIA



**AUXILIARY POLICE** 



**BOMB SQUAD** 



**AUXILIARY FIREMEN** 



FIRE WATCHER



RESCUE PARTY



MEDICAL CORPS



NURSES AIDES CORPS



MESSENGER



DRIVERS CORPS



ESENCY FOOD AND HOUSING CREW DEMOLITION AND CLEARANCE CREW





ROAD REPAIR CREW



**DECONTAMINATION CORPS** 



STAFF CORPS



**ENROLLEE, FIRST CLASS** 



SQUAD LEADER



SECTION LEADER

as well as their services as drivers will be enrolled. Cars and drivers can be assigned by the Coordinator of Transportation to first aid parties, casualty clearing stations, control and message centers, and to the staff of the local Defense Coordinator.

Emergency Food and Housing Corps. Insigne; a red coffee cup in a white triangle set in a blue circle. Modern warfare necessitates planning and providing emergency feeding and housing for persons whose homes have been damaged or destroyed. Experience in mass feeding, dietetics, and handling large groups is valuable in this type of work.

Fire Watcher. Insigne; a red flame in a white triangle set in a blue circle. The persons selected for this job will be assigned to posts on roofs, in doorways, and other vantage points where they can spot and quickly reach fallen bombs during air raids.

Medical Corps. Insigne; a red Caduceus in a white triangle set in a blue circle. Emergency Medical Field Units composed of doctors, nurses, and nursing auxiliaries will handle the problem of

caring for the sick and injured in event of a civilian disaster or war a gency.

Nurses Aides Corps. Insigne; a cross within a white triangle set in a circle. Women volunteers who have ceived special training by the Red 0 or in hospitals will become eligible assist nurses in hospitals or in via nurse, public health, industrial hyparand school health services.

Messenger. Insigne; a red flai lightning in a white triangle set in a circle. When other means of commution is disrupted, a messenger may through. Boys and grls from 15 year age upward may be used for this w

Rescue Squad. Insigne; a red lai in a white triangle set in a blue at After an air raid civilians may be in trapped in debris, shelters, flooded lars, or exposed to danger from hot gas and water mains or unprotected tric wiring. Rescue Squads must be no at all times to go into action to extina them. A squad-usually consists of 10 m

Road Repair Crew. Insigne; a red she el in a white triangle set in a blue he



Manufacturers of gun parts of other small parts are speed up production with Fenn Out

Action Vises. No she hand cranking. Instead quick - action cam len throws the jaws togeth instantly, and the east tric handle locks the was ecurely. On small part where operator has lock and release was quickly, the Fenn is Vise to use. For completinformation, write Dept.

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December, 19

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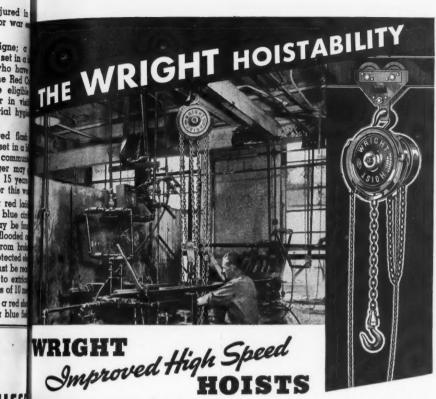
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### LIBERTY GRINDING ATTACHMENT

**Gives Your Surface Grinder** an Extra Hand



Easily attached to most surface grinders to eliminate expensive set-up time where small wheels are necessary. Grinds slots, recesses and surfaces, etc., which are impossible to reach with large grinding wheel.

Accurately handles a wide variety of tool, gage, die and other grinding jobs. Assembled complete with any size bores, pulleys, belts and grinding wheels at no extra cost.

Write - specifying diameter of spindle head, type and make of grinders.

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Regular street and road repair a must be augmented by able civilian unteers who can help to restore the mal flow of traffic quickly after a raid or other major disaster.

Staff Corps. Insigne; initials CD in set in a white triangle within a blue a flanked by the initials U S. The Corps, consisting of men and women executive ability, will be assigned to types of administriative and office w

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"Background" is the title of a col ful eight-page, 8½ x 11-inch booklet pared by The Cleveland Worm & Co., 3277 E. 80th St., Cleveland, 0 The booklet emphasizes the company claim for long range, economical open tion of Cleveland Worm Gear S Reducers by quoting a series of lets from manufacturers in various lead industries who began purchasing Cle land drives 15 to 20 years ago. I handle Tri-C various reports describe graphically conditions under which gear driven chinery must operate in each partie industry. Copy of booklet free upon quest.

Handee, Tool of 1001 Uses. In this page booklet, publication of the Cha Wheel & Mfg. Co., 1101 W. Monros Dept. MM, Chicago, Ill., are included detailed descriptions and illustrations the Handee-a portable electric tool i use in drilling, carving, routing, shing, polishing, filing, grinding, cleans and so on. The booklet contains sh trations showing the Handee tool be used in removing corrosion, painting glass, marking tools, model builds cleaning and polishing silverware, is sharpening, and so on.

A feature of the booklet is the A zan, the new Handee hobby tool. A covered in the booklet are Hi-Portable electric grinders. Several parts of the covered parts of the c contain drawings and illustrations sh ing the various grinding and polish wheels, cutters, saws, mandrels, brush and so on, that can be used in Handee tool. "Chicago" Mounted Gris ing Wheels are given particular att tion. The latter part of the booklet devoted to charts of wheel and mand sizes. Copy of booklet free upon requi

Everyone can participate in the Nata Defense Program by buying Defense Sant Bonds. Ask your banker.

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WITH THE TRI CLAD MOTOR

Extra Convenience Features half you got the Tri-Clad motor into service with service texter—keep it in service with

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#### Easy to Handle

They can be moved nto position easily because of their light reight and compactess. The shape of the hearing housings and helocation of end-shield andle Tri-Clad motors with slings



#### 2. Quickly Mounted OF Altered

The reversible stator puts the roomy conduit box on the most con-venient side and the end-shields can be rotated to any of four positions to meet mounting requirements



#### Easy to Wire

A large, four-position conduit box gives unrestricted working space. It can be quicky removed for wiring. Flexible leads are press ed on the terminals which are permanently identified. No soldered connections are necessary



### 4. Convenient

to Lubricate
All Tri-Clad motors
have a large oil or
grease capacity. On sleeve-bearing motors, the oil-filler gage can be located on either side of the bearing housing. On ball-bearing motors, a pressure-relief greasing system assures rapid and thorough greasing

BUILT FOR FIRST TO LAST

Extra Protection 3 Ways

HELPS ASSURE LONG SERVICE LIFE Production interruptions are avoided and operating time is saved when the motor you buy can at and up time is saved when the motor you buy can at and up and the many adverse operating conditions commonly found in industry Tri. Clad motors meet these conditions with—

- 1. Extra Protection against physical damage 2. Extra Protection against electrical breakdown

3. Extra Protection against operating wear

The new General Electric Tri-Clad motor is a cinch to install. Its convenience features pay off in precious minutes saved-both for those who build motors into machines and for those who use

Next time you order motors, take time-saving into account, along with protection and performance; make sure you get Tri-Clad motors-now available in a wide range of types and integral horsepower sizes to 20 hp.

Write for Bulletin GEA-3580 which gives full details about these extra presection features and other Tri-Clad motor advantages.

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MODERN MACHINE SHOP

146

December, 1941

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Today our job is to make guns, tanks, airplanes and battleships . . . an all out for defense that finds hundreds of Kellerflex machines operating 24 hours-a-day. Grinding, burring, sanding and polishing operations that took hours of hand work in 1918, the modern Kellerflex disposes of in record time—and it does a better job.

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Whether it's to protect your home or to improve it...war or peace...you can depend upon Kellerflex. Its speed meets the tempo of modern streamlined production—its quality is maintained under 24 hour-a-day schedules—the work it produces meets all the standards of modern industrial progress. Pratt & Whitney is Headquarters for the finest of Flexible Shaft Equipment. For information write the Kellerflex Sales Department, Pratt & Whitney, Division Niles-Bement-Pond Company, West Hartford, Conn.

### PRATT & WHITNEY

December, 1941

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# Grinding Hardsteel Drills

A GREAT deal has been published in the past about the correct way to grind the twist drill, but very little has been said about the correct method of grinding the recently developed straight flute type of drill known as the "Hardsteel" drill. This drill is so named because of its ability to cut through unusually hard substances.

In drilling with Hardsteel drills, the proper method is to bring the point of the drill to bear on the workpiece and then apply sufficient pressure to cause the chips to curl at the point of the drill. Of course this can only be properly accomplished if the drill is correctly ground.

Hardsteel drills may be ground on any type of grinding wheel that may be considered suitable for grinding other types of drills. Reasonable care must be taken, however, to maintain approximately the angles and lands of the original drill. For best results, the drill should be ground at an angle of 65 deg. from the center line with chip clearances on the side, leaving 0.040 inches to 0.060 inches land on the angles. This operation is illustrated in Fig. 1.

The drill is best sharpened on the side of a wheel, so that the surface produced will be flat rather than concave. The chip clearance groove, one

of which must be generated in each one of the three faces of the drill, is ground in as shown in Fig. 2, by holding the drill against the rounded coner of the grinding wheel and rocking it back and forth as the grinding operation proceeds. To accomplish this, the drill must be firmly held so that it cannot suddenly be swerved by this cylindrical action of the wheel, and the hands should be rested against the side of the wheel guant.



Fig. 1—To Grind the Hardsteel Drill, the Drill is Held Against the Grinding Wheel at a Angle of 65 deg. from the Center Line

December, 1941

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Furnishing the correct and most efficient working pressure for each air operated machine not only means better performance, but most economical use of air power. The Hannifin Pressure Regulating Valve is easily adjusted over the full range to any required operating pressure merely by turning the adjusting screw. The exclusive piston-type design is simple and dependable, built for long life without maintenance. Sensitive action and large volumetric capacity provide an accurate and consistently maintained reduced working pressure. The Hannifin Regulating Valve meets a wide range of service requirements without change of parts, simplifying applica-

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Furnished complete with pressure gauge.

PROMPT DELIVERY. Hannifin Åir Pressure Regulating Valves are available in four standard sizes for immediate shipment.

Write for Bulletin 56-MM with complete description of the design and performance advantages of Hannifin Pressure Regulating Valves.

HANNIFIN MANUFACTURING COMPANY 621-631 South Kolmar Avenue • Chicago, Illinois

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December, 1941

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MODERN MACHINE SHOP

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P-3 Models are available in immersed type (1-P3), flangemounted with internal discharge (2-P3), flangemounted with external right hand discharge (3-P3), left hand discharge (4-P3). All above are available in short and long models, that is, for two maximum high water lines.

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Write for engineering data and specifications.

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or upon the tool rest which is form on most tool grinders so that h hands can be held steady and h grooves can be ground accurately.

To grind a "flat bottom" on to

drill for bottoming or counterboring the drill is held at right angles to the side of the grinding wheel, as show in Fig. 3, and the drill is ground little at a time, care being taken m



Fig. 2—Grinding the Chip Clearance Grooms in an Hardsteel Drill. The Drill is Held Against the Corner of the Grinding Wheel and Rocket Back and Forth.

to burn the drill. The natural tendency, when grinding against the end of any tool, is to force the tool against the wheel too hard, which may result in burning the metal or lowering the temper. This must always be watched in grinding bottoming drills or similar tools. When the end of the drill has been ground sufficiently, the chip clearance groove is ground in the manner illustrated in Fig. 2.

In using a freshly-ground drill, it will be noticed that the extreme point of the drill will flatten slightly. This is necessary for the drill to start cutting. It is not necessary to sharpen

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December, 1941

MODERN MACHINE SHOP 151



Fig. 3—Grinding a Flat Bottom Hardsteel Drill for Bottoming or Counterboring.

a Hardsteel drill until it has reached the point where it will no longer cut freely. When accuracy is essential in the drilling of the hole, the same ca must be taken with Hardsteel del that would be necessary when usin ordinary twist drills in soft metal

"Graham Dial." To help solve to problem of keeping up with the ner when reading time is short. Graha Transmissions, Inc., is issuing a month ly digest of current technical news for industrial executives. Known as a Graham Dial," the publication on tains a brief abstract of outstandin articles in the technical press. Articles presented are chiefly from original agineering sources so that the information tion is fresh and authentic; subject may ter is "boiled down" to just the essen tial facts, with the source given in ful so that the interested reader may readily refer to the complete article Included are brief articles on Metalli Traction and the Graham Variable Speed Transmission.

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MORE AND MORE USERS of lapping compound have learned from experience that the surest way to get uniformly superior results is to insist only on CLOVER Compound!

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December, 1941

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MODERN MACHINE SHOP

### Modern Equipment at Work

#### A Fool-Proof Test for Cracks

POWER presses, recognized as one of the most hazardous groups of industrial machines, are given careful periodic tests at the General Electric Company's Schenectady Works. A unique test is the magnetic test to which punch-press crankshafts are

subjected.

The magnetic test consists of magnetizing the shaft, making the direction of the flux longitudinal so that it will intercept any possible cracks at right angles. While magnetized, the shaft is sprayed with kerosene which has in suspension finely divided particles of magnetic iron oxide. Any cracks or discontinuities in the metal will set up magnetic poles, which, while very slight, are strong enough to attract and hold the iron-oxide particles, thereby outlining a crack which may ordinarily be invisible to the naked eye.

This test is made each time a shaft is removed from a punch-press for any reason, as a punch-press crankshaft is subjected to tremendous strain in operation. One large conpany recently tested a group of a crankshafts, using this method, and found that 14 of them were cracked and required replacement.

#### Induction Heating Speeds Production

THE necessity for greater speed in forming and heat treating steed parts for machines has more than doubled the demand for high frequency inductive heating generator, according to J. B. Walker of the Westinghouse Electric & Manufacturing Company.

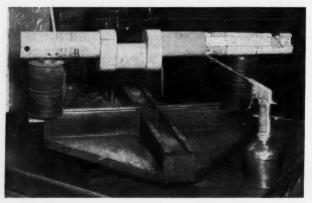
Heating metal parts by induction makes it possible to harden steel surfaces to any desired depth and width A shaft can be hardened at points where it must resist wear without the toughness of the whole piece being destroyed. This is an important point, because most methods of heat hardening tend to make steel brittle in the process of making it wear-

resistant.

In addition to having certain advantages for the hardening of machine parts that must with stand wear,

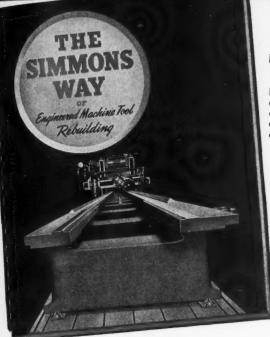
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Punch Press Crankled Set Up for Magnetic let for Detection of Possible Fatigue Cracks

# THE BOOK IS OUT!



WHY
MACHINE TOOL REBUILDING
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DEFENSE PROGRAM requires every existing tool in working condition. Know how all types of machine tools can be adapted to current problems.

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- Reveals how Simmons motorizes obsolete equipment . . . installs Power Rapid Traverse to lathes, boring mills, milling machines and planers . . . and increases capacities.
  - Shows how Simmons designs and builds special-purpose and standard equipment as a result of its wide rebuilding experience.

This 58-page catalogue illustrates today's most efficient methods of machine tool rebuilding. For the first time, through words and photographs, you have the complete answer to "What is a rebuilt machine tool?" Here you find photographic case histories of vitally needed machine tools rebuilt, re-designed and modernized by Simmons.

You who know the importance of your machine tools today should be familiar with this means of increasing their productivity.

A request on your company letterhead will place it on your desk.





SIMMONS MACHINE TOOL CORP.
1745 NORTH BROADWAY, ALBANY, N. Y.

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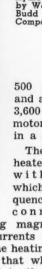
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Induction Heating Unitary Heating Cooled, Build by Westinghouse for the Budd Induction Heating Company, Detroit, Mich.

induction heating is also applicable for softening steel so that it may be rolled or pounded into shape.

Shown here is one of the largest induction heating units yet made, being set up for the Budd Induction Heating Company. The unit is large enough to merit hydrogen cooling. This 9,600-cycle unit consists of a

500 kw generation and an a n/800 hp, 3,600 r.p.m. driving motor mounted within a single housing

The steel to be heated is placed within a coil to which the high frequency generator is connected. The

PROPELLER

CONNECTING RODS

rapidly - varying magnetic field induces eddy currents in the metal thus causing the heating. It is an interesting fact that whereas a piece of steel placed in the machine wilheat to a high temperature within a few seconds, a person's hand placed in the machine in the same position will not be affected.

Walker-Turner Machine Tools. A completely revised, 56 - page catalog which profusely illustrates and describes in detail the standard line of metalworking and woodworking machine tools made by the Walker-Turner Co., Inc., Plainfield, N. J., is now being issued by this firm. Also shown are a number of entirely new machine tools developed primarily for the defense industries. A unique radial drill press, two polishing lathes, and a radial machine for cutting ferrous and non-ferrous metals, plastics, and ceramics are featured.

The other well-known machines and equipment manufactured by this company and described in the catalog include metal-cutting bandsaws, radial saws, circular saws, lathes, flexible shaft machines, grinders, belt and disc surfacers, motors, drill presses, spindle shapers, transmission equipment, and so on.

Copy of catalog can be obtained by writing to the Walker-Turner Co., Inc., South Ave., Plainfield, New Jersey.

P & W Precision Gage Blocks and their uses are covered in a 20-page called alog prepared by Pratt & Whitney, Division Niles - Bement - Pond Co., West Hartford, Conn. The catalog, which llustrates and describes both P & W Hoke and USA Blocks, is available free upon request.

"Hardsteel" Drills for use in drilling counterboring, countersinking, and reaming hardened steel is the subject of a 12-page informative booklet prepared by the Black Drill Co., 5005 Euclid Ave. Cleveland, Ohio. Included with the booklet is a price list of Hardsteel Drills. Copy of booklet free upon request.

Hevi Duty Pit Type Convection Furnace. Bulletin HD 1041 on the Hevi Duty Pit Type Convection Furnace is now available from the Hevi Duty Electric Co., Milwaukee, Wis., free upon request.

GEARS CARTRIDGE DIES SHELL CHAMBERS



Bryant Hydraulic Internal Grinders are part of the "ground crew" that makes the tremendous fire power of modern military planes possible. Leading aircraft, aircraft engine, and aircraft armament manufacturers appreciate the precision, fine finish, and fast production offered by the Bryant method. That's why, whenever you see an airplane, you see parts that were ground on a Bryant. A post card will bring you the new Bryant Aircraft Catalog. Send for your copy today.



SPRINGFIELD, VERMONT, U. S. A.



No. 16-C-16 Bryant Internal Grinder



December, 1941

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MODERN MACHINE SHOP

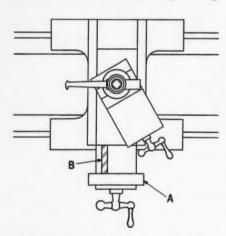


#### Thread Cutting "Kink"

By FREDERICK J. COOPER

HERE is a kink that is useful in thread-cutting, and which I haven't seen anyone else using.

When cutting an inside thread on a piece chucked in the lathe, a piece of steel squared at the ends is inserted between the regular crossfeed stop and the end of the cross slide. The tool is then fed by setting



Drawing Illustrating Use of Steel Spacer in Cutting Internal Thread

the tool rest at an angle as shown in the drawing. When it is desired to test the hole for size, the piece of steel is removed and the tool is moved out of the way by using the cross feed.

After testing the thread, the toll can be returned to the exact position it occupied before by inserting the steel piece between the cross slide and the cross-feed stop as before. This method eliminates necessity of running the carriage back to clear the length of the thread gage, which is often a tedious process.

#### Drilling Spring Steel

By EDMUND LEDUC

ONE of the old-time machinists in our shop was given the task of drilling some pieces of spring steel which were so hard that they couldn't be punched. To our surprise he drilled them without difficulty, and it was evident that the secret lay in the drilling compound that he used. At first he would tell no one what it was, but the boss finally prevaled on him to reveal it. His formula was as follows:

Dissolve a small amount (he said about a quarter's worth) of camphar gum in a half pint of alcohol and said a half pint of lard oil. With this lubricant he offered to bet that be could drill through a piece of plate glass without breaking it, if the drill were ground at the correct angle. He also said that by using the compound it would be possible to file a piece of

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Cutting-off nested small diameter tubing— Spices per cut. On production jobs like this, the extreme accuracy and compara-tively line teeth of the blade produc-smooth-edge, semi-finished pieces at very low cost.

#### "It has increased production about 30%" at Independent Pneumatic Tool Co.

Used to cut off a great variety of stock; cold drawn tubing (2335 S.A.E., 3115 S.A.E., and 3135 S.A.E.), angle iron, and round, hex and square bars in a wide range of sizes, this MARVEL No. 8 Metal-cutting Band Saw "has increased production about 30%" in the cutting-off department of the Independent Pneumatic Tool Co., Chicago.

The most versatile metal-cutting saw built, the MARVEL No. 8 is a truly universal tool. It handles work up to 18" x 18" cross section; cuts at any angle from 45° right to 45° left; does mitering, notching; saves warehouse delays and "cutting extras" and saves hours of machining by roughing work to size and shape.

extras" and saves hours of machining by roughing work to size and shape.

#### ARMSTRONG-BLUM MFG. CO.

"THE HACK SAW PEOPLE"
5700 Bloomingdale Ave., Chicago, U. S. A.
Eastern Sales Offices: 225 Lafayette St., New York, N. Y.

window glass. We didn't try it, but it was evident that he had an extremely useful compound for drilling unusually hard materials.

### Form Tool Steadyrest for **Turret Lathes**

By Walter G. Porter General Manager, Porter Machine Company

MONG the many and various jobs that are handled on the turret lathe and the hand-operated

It is generally conceded that the machining of a cylinder by forming lesigned is faster than by turning with a single point tool, also that forming produces a better finish. Which brings up the matter of a job with which the writer came into contact

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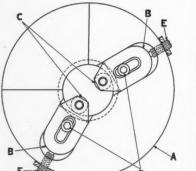
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The job was to produce a No. 10 x 4-inch tapered pin on a Brown & Sharpe No. 4 Wire Feed Screw Ma-The machine is of the manually-operated type, employing a round turret with eight positions.

production of these pins

involved machining them to an accurate taper over their entire length. The machine was not, however, and still is not, equipped with a taper turning device for the turret. The problem thus presented was comparatively simple except that, in the production of an accurate taper,



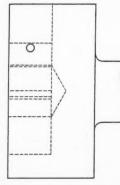


Fig. 1-Plan Drawing of Form Tool Steadyrest for the Turret Lathe

turret-type screw machine, those upon which forming is required present problems which frequently result in the job being done by other-and perhaps more expensive-methods.

the springing of the piece slowed down production and resulted in a high percentage of scrap.

To overcome the condition referred to, a steadyrest to support the outer



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at the end of the stock while in process was designed and built. The feature of with the rest consists in the use of two ollers which serve to hold the piece

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is locked in position and the job proceeds.

The one side of the cross slide is used to carry a straight edge form

> tool which is mounted at an angle which will produce the desired taper per foot. As the tool comes into contact with the work, however, the work is prevented from springing by the roller test, making it possible for the form tool to turn the entire

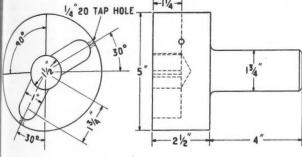


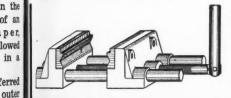
Fig. 2-Detail Drawing of Body

in alignment and prevent it from springing away from the tool. operation, the turret slide is brought forward until the stock is in contact with the roller rests, then the slide

four-inch length to the desired diameter with satisfactory results.

It has also been found that, by employing this method, many jobs which ordinarily would be turned can be

## JOHNSON 3-WAY DRILL VISE



Jaws 5" wide, hardened, reversible, open 5". Holds round, square and flat shapes. Vise usable 3 ways. Write for folder.

Price \$15.50 Send orders now for early deliveries.

Mold Your Own" LEAD HAMMERS with this Lead Hammer Mold. Casts ham-

mer heads over pipe or wood handlesvery simple to operate. Also: Bench Vise Jaw Mold—for lead vise

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Lead Hammers—all sizes in stock.

Write for Circulars and Prices

JOHNSON TOOL CO., Inc. MASSASOIT AVE. EAST PROVIDENCE, R. I.



December, 1941

MODERN MACHINE SHOP 165



#### WOODY SPENCER SAYS:

"THE RIGHT PLAY AT THE RIGHT TIME WON A CHAMPIONSHIP."



The final game in the American League Championship series between the Hershey Bears and Cleveland's Barons entered the overtime period on a tie score, 2-2. At 1:25 the Baron Bartholome streaked down the side of the rink to catch a pass from Jake Milford and Don Deacon from 20 feet out. Bartholome drove the puck past the Hershey goalie and into the net. The game ended .. the Barons had won. The right play at the right time had turned the trick.

You may be able to "turn a trick" in your production by checking the taps you are using. Are they the right type for the job to be done? If you have the slightest doubt—call in our engineers to help you. Wood & Spencer engineers are available without obligation to manufacturers. Write us today, explaining briefly your situation. The Wood & Spencer Co., 1920 E. 61st., Cleveland, Ohio.

"The Right Tap at the Right Time"



formed with very attractive savi in costs and marked increases production.

Figure 1 is a plan drawing show the construction of the steadyn The rest consists primarily of the parts; the body and two roller slid with the necessary adjustme screws. Following is a description the several parts.

The body A, Fig. 1 was tun

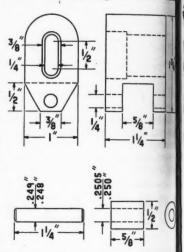


Fig. 3 (Above) and 4 (Below)—Detail Doings of Parts for Form Tool Steadyrest

from machine steel to the dimension given in Fig 2. It will be noted to the means for mounting consists this case of a shank of 1% indiameter. However, for use on he type turrets, this design could be altered to fit the case.

The roller slide B (two pieces required) was made from cold rolle steel, machined to the dimension given in Fig. 3. The sides were abburized and hardened to preven nicking and burring, after which they were ground all over. Slide should be made from material of the correct width to ensure a close slide ing fit in the milled slots in which

## Can you find the Defense Weapon in this picture?



This is a war of machines. And one of its decisive battles is being fought in the tool rooms of America - with diamonds as weapons! For the high speed production of alloy steel parts depends on cemented carbide cutting tools. Tools so hard that only diamonds can give them the fine, true edge necessary for efficient cutting. Thus Carborundum Brand Diamond Wheels are playing a vital part in helping America re-arm.

Because these cutting tools are the hardest known, sharpening and conditioning them posed a special problem. Carborundum solved it by developing a grinding wheel made of crushed South African diamond bort. With this wheel, cemented carbide tools can be finished to a better, truer longer-lasting edge in a fraction of the time formerly required.





Development of new abrasive products to meet new needs is an old story with Carborundum. This "know how" is now speeding up thousands of defense jobs. The Carborundum Company, Niagara Falls, New York.

Carborundum is a registered trade-mark of and indicates manufacture by The Carborundum Company.



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se slid which they are to be located.

The rollers, C, were made from drill rod, hardened and ground to size, as shown in Fig. 4. should be taken to ensure that the holes in the rollers which serve as the bearings for the pins on which they turn will not be too close a fit. A close fit here is really not essential; a slight run-out on the roller will do no harm since the pressure is all in one direction anyway. The pins are also made from drill rod and are hardened and finish-ground to a press fit in the drilled holes of the slide section in which the rollers are mounted.

The two hollow head capscrews D, which are 4-inch diameter, are used to hold the roller slides in fixed position after the setup has been made. They permit adjustment of the slide, for which an elongated slot is milled in the slide.

The two standard 1/4-inch 20-thread

dog-point setscrews E provide men for adjusting the slides. A jam is used to prevent the screws to working loose after they have h properly set.

The writer is of the opinion anyone who makes this device find it a very handy tool and one i will pay for itself many times of in savings on a wide variety of wo

## Reducing Accidents in Planer Operation

By ERNEST W. FAIR

REDUCTION in the number accidents on planers means l spoilage of work, longer life for chines, lower machine maintenan costs, and less personal injury operators. All of these desired factors merit continuous conside

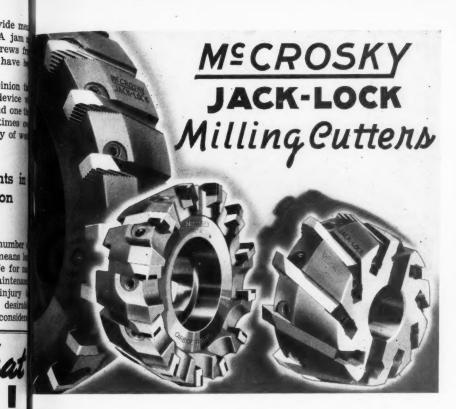


Think what this means to stepped-up production N bushing costs - no delay in change-overs - no hold way . . for special size bushings. • Drill bushing stocks are not required only for old fashioned out-of-date holden

To attain and maintain maximum production schedules make full use mechanically-correct economical Alco Tools.

Adjustin

means o



OU can measure McCrosky JACK-LOCK advantages by shorter down time and longer blade life. When the cutter has to be resharpmed, the JACK-LOCK Wedges can be quickly unlocked and locked. Adjusting screws behind the blades provide a quick and controlled means of holding to a uniform minimum the blade stock to be ground hold a away . . . Ask for McCrosky bulletin No. 15-M.

## Mc Crosky Tool Corporation

PENNSYLVANIA

SUPER ADJUSTABLE REAMERS JACK-LOCK MILLING CUTTERS WIZARD QUICK-CHANGE CHUCKS

ADJUSTABLE BLOCK BORING BARS SPECIAL PURPOSE TOOLS

McCROSKY TURRET TOOL POSTS

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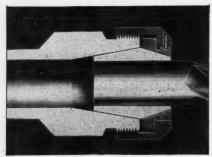
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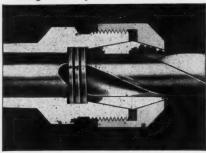
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# NEW FEATURES IN UNIVERSAL COLLET CHUCKS



In larger sizes Z, ZZ and XZ nut tightens against a floating sleeve which reduces locking effort by 50%. Nut is jet black and fluted for tightening with a spanner wrench.



In smaller sizes OW, WW, and Y a release spring forces collet forward, as nut is loosened, automatically releasing the grip on the tool.

## UNIVERSAL

Engineering Company Frankenmuth, Mich. tion of accident prevention by properators. Below are a number helpful pointers gathered from eran machine operators.

(1) Watch overloading; never a cut that will strain the made beyond its capacity. Sometime hot bearing will indicate an overthough more often jumping, gring, trembling, or chattering of machine is the warning signal.

(2) Belts should never be too to nor must they be too loose. A that is too tight throws an a strain on the bearings.

(3) When the motor begins heat, it should be stopped promp so as to prevent it from burning a The heating up of the coils in fields is a warning that the motor either working too hard or there something wrong in the winding.

(4) Never run the table off bed.

(5) Don't tighten clamps on twork while the machine is in opation.

(6) Watch the rail; don't let get too low.

(7) Watch tools carefully; don't them get hung in the work.

(8) Never try to operate the mechanism when the clamp on the head is tight.

(9) Never try to operate the rical feed in the head when clamp is tight.

(10) Keep all working surface clean at all times.

(11) Guard your hand against be caught between the tool and work between the work and some part the planer.

(12) Wear goggles if you working on materials throwing as or chips.

(13) Never place your hand on tool or the work near the tool will the machine is running.

(14) Always stop the machine brush off chips.

SPECIFY F-M MOTORS
with the Copperspun Rotor

There's no motor so capable of operating dependably under the most severe plugging and reversing service as the Fairbanks-Morse Motor with one-piece rotor winding centrifugally cast of SOLID COPPER.

That's because copper has better electrical, thermal, and mechanical characteristics for motors than any

other metal of which rotors are

cast. You get the unique benefits of cast copper rotors in F-M Motors without extra cost... only F-M has succeeded in producing the Copperspun rotor.

Get the complete story of what F-M Motors can do for you. Write Fairbanks, Morse & Co., Dept. L-201, 600 S. Michigan Avenue, Chicago, Ill. Branches and service stations throughout the United States and Canada.

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FAIRBANKS · MORSE PMOTORS

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DIESEL ENGINES ELECTRICAL MACHINERY RAILROAD EQUIPMENT WASHERS-INOVERS STORERS
PUMPS FAIRBANKS SCALES WATER SYSTEMS FARM EQUIPMENT AIR CONDITIONIES

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#### Producing Transformer Laminations Without Waste

By W. LINGENFELDER

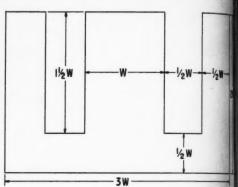
REGARDING the article on page 146 of the July, 1941, issue of MODERN MACHINE SHOP—"High Speed Blanking Operations," by C. C. Hermann; the set-up shown wastes

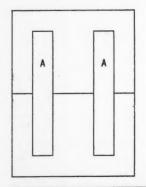
two small pieces of stock. Mr. Hermann's data on the punching of stock was very interesting, but I believe that these pieces can be saved.

In the set-up described here two laminations are produced simultaneously which is a very desirable feature, as by slightly altering the proportions of the laminations all waste can be eliminated.

The laminations herein describ are the familiar "I" and "E" by punchings. What would ordinarly the waste from the "E" pieces of be used for making the "I" piece when two are blanked at once shown in Fig. 1. Then the pieces form the end closing strips as show at the right in the illustration.

Figure 2 shows the proportion





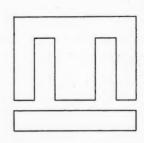


Fig. 1 (Left)—The Waste is the "E" Pieces Can Be Used the "I" Pieces. Fig. 2 (Abon —Drawing Showing Proposition Necessary to Make Parts Mate

necessary to make the parts match. The propertions are in accord will good electrical engineeing practice, and lamin tions of this type are used by many transformer manufacturers.

## EVANS HIGH SPEED STEEL REAMERS



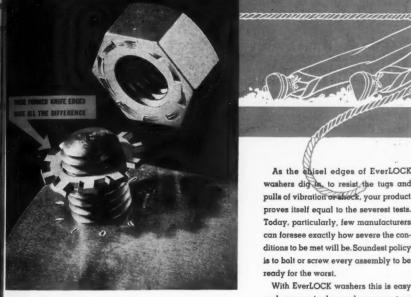
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- No boning. Will not chatter.
- Chrome-like finish.
- WILL SHIP ON 30 DAYS' TRIAL
- · Perfect alignment.
- Full bearing surface.
   Left and right spirals.
- o 50 to 80 thousandths expansion
- Cannot fall in slots or oil green.
  Extension pilots for line-up well.
- EVANS FLEXIBLE REAMER GORP. 4541 RAVENSWOOD AVE. CHICAGO, ILL.

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TYPES FOR SPECIAL APPLICATION

As the chisel edges of EverLOCK washers dig in to resist the tugs and pulls of vibration or shock, your product proves itself equal to the severest tests. Today, particularly, few manufacturers can foresee exactly how severe the conditions to be met will be. Soundest policy is to bolt or screw every assembly to be ready for the worst.

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With EverLOCK washers this is easy and economical - and represents a higher standard of manufacture at no greater cost. The difference is chiefly in the washer design which gives several times more area of resistance (see illustration) with this tooth type washer than with others. The principle is that used by a man who, in a tug of war, braces the whole side of each foot against the earth rather than his heel alone.

Get the handy catalog which shows the whole line at a glance. Just write for it and for an EverLOCK demonstration on your product.

BREMER & CO., 1640 W. HUBBARD ST., CHICAGO, ILL

December, 1941

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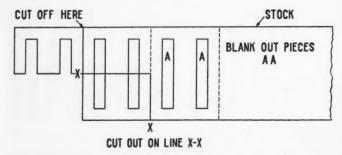
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MODERN MACHINE SHOP



As the size of the center tongue of

the lamination is the important di-

mension in determining the coil size,

this dimension is used as a basis for the core size. It will be observed that

the depth of the cuts is 11/2 times

"W" and the total width is three times the dimension "W"; thus when

cutting two laminations, the "scrap"

forms the closing ends of the core.

By making a progressive die based on the design shown in Fig. 3, this Fig. 3—Basis of a sign for Progress
Die to Eliminate Scrap

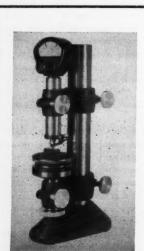
job can easily done and the sired result complished. A operation to se pieces A-A in a narrow st

of stock is eliminated by this meth of producing both parts of the kn nation.

## Calculating Helix Length of Coiled Springs

By Andrew J. Hamilton

IN THIS article, the writer present a special formula for calculate helix length in the manufacture



## **MIKROKATOR**

"Mikro" (Minute)

## Frictionless Amplification

Complete elimination of friction, lag, and backlash insures positive, dependable repeat readings. Pointer responds instantly to the slightest movement of measuring tip without swinging past the true reading. No waiting for pointer to come to rest.

No lights or electro magnets are used, as the amplification is 100% mechanical, thus eliminating a warming up period to permit the temperature of the instrument to become stabilized.

There are no electrical connections thereby enabling the instrument and stand to be readily moved about in the shop, for use in different locations.

Graduated—.0001" to .00001" Graduated—.001 mm to .0002 mm

SWEDISH GAGE CO. of AMERICA

7310 WOODWARD

DETROIT, MICH.

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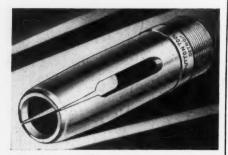
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## FOR A STEADY PUSH ON SCREW MACHINE PRODUCTION



## **SUTTON FEEDERS** with long-life spring tension



and Sutton Style L Master Feeder—Holds Pads without pins on screws.



 Sutton DIAMOND-GRIP Collets are perfect partners for Sutton Feeders.

Ask for complete Sutton Catalog.

## SUTTON TOOL COMPANY

2895 W. Grand Blvd., Detroit, Mich. Accessories for Screw Machines coiled springs. The general form for helix length is given as

$$L\,=\,n\,\sqrt{c^{\scriptscriptstyle 2}\,+\,h^{\scriptscriptstyle 2}}$$

when h = distance advanced by generating point in revolution

c = circumference described the generating point n = number of turns

The following adaptations of a formula will be found convenient slide rule calculations, by virtue the isolation of the number 1 un the radical.

$$L = C \sqrt{(\frac{PD}{318.3})^2 + 1} = \frac{T}{P}$$

$$\sqrt{(\frac{PD}{318.3})^2 + 1} = C$$

$$\frac{DT}{(\frac{DT}{318.3C})^2 + 1}$$

where L = helix length in inches  $C = \text{finished coil length in the length in th$ 

inches

P = pitch in turns per inch

D = sum of mandrel and will
diameters in mils

T = total turns

For example, suppose it is desired to calculate the helix length of a of 2½ inches long, coiled with 2 wire on a 9 mil mandrel and with pitch of 400 turns per inch. It pressed by formula, the calculations

$$L = 2.5 \sqrt{\frac{400 \times 11}{(\frac{318.3}{318.3})^{2} + 1}}$$

By slide rule:

A—find 191.5 to (191.5 + 1)

CI—set 11 over 318.3

C—Set 1 under 2.5 D—over 400 find 34.7 in. (ans.) · PRON

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Radial Drille

## WALKER-TURNER RADIAL DRILL



## • PROMPT DELIVERY to plants engaged in defense production

is desire Versatile, speedy, accurate-Walker-Turner Radial Drills have made themselves indispensable to many Defense industries—aircraft, shipbuilding, tank manufacturing, oil making, and etc. In the interests of National Dend with fine, first consideration in delivery necessarily, b high priority ratings. Immediate shipment of these Radial Drills is made to concerns engaged in Defense tase, first consideration in delivery necessarily is given ch. B reduction. However, our enlarged facilities and three shift manufacturing schedule enable us to make reasonably prompt shipment to plants with low priority

three phase motor with push-button control.
Overall Dimensions: height 72", width 31", depth 58".
Shipping weight 450 lbs.
Bail Bearing Mounted: aid-ing ram carried on 8 preci-sion ball bearings with provision for take-up for

Six-Spirice Spiridle four pre-cision ball bearings. Drive particles of the pre-cision ball bearings. Drive climinate bett strain. Climinate bett strain. Climinate professional ball ball ball strained by the pre-rese of spiridle 33½. Craw-erse of spiridle 33½. Column diameter 33½. Miscellaneous strill may be titted to 45 right or left. Drill press head cast in one piece. Run-out accuracy guaranteed within all indus-trial standards. Extremely rigid when tooked in drilling position. Minimum deflection.

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> WALKER-TURNER MACHINE TOOLS FOR METAL, WOOD AND PLASTICS

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ber, 194 December, 1941

MODERN MACHINE SHOP

177



### Education for Democracy

THE observation has often been made that no one appreciates the liberty and opportunities available in this land of ours so much as the immigrant—the man who has left his native land to become an adopted son of Uncle Sam. Here he can own a home, farm, or a business if and when he has the money to pay for it; here his vote counts for as much as any other man's in the selection of the Government by which he is ruled; here he is not bound to certain duties in the interest of a "party" in order to have a job, or to be able to obtain food, or so that his children may have an opportunity to obtain an education.

One of the amazing things that has become apparent in recent years is the fanatic loyalty of the younger generation in Germany as regards their Government and the man at the head of it. Considering the manner in which the youth of that country are herded about like sheep, such devotion is incomprehensible to us who have always done pretty much as we please. It is only upon close analysis that we are able to understand what has taken place there.

Adolph Hitler may have been a house painter or paperhanger, but nevertheless he will be recorded in history as one of the greatest organizers of all times. It is undoubtedly true that his place at the head of the German Government and the effort that Germany is now making under his direction to subjugate the entire civilized world to German control is the crystallization of an idea which has dominated his entire life. Through years of dreaming he worked his idea out detail so that when the opportunity party" rived he was able to grasp it and a into immediate practice these plans devoted i lifetime.

One of the most important of his idea and the co was that of controling the youth of G many and training them in the way the fitter is he wanted them to go. He realized to mad Ge the plan that he had in mind—a phyworkers is which meant completely rooting up to workers is traditions. traditions and principles which ha guided Christian Germany for many ge erations—was one that would have to erations—was one that would have to be Germany and the who seem upon those youth he would have heir par depend for its culmination.

Circumstances after the World Waterportant were ripe for just this sort of thing; the ples used bitterness of defeat which seemed to pe soldiers of meate the very frames of the German of the and was demoralizing; lack of discipline we jects whithe order of the day. Into this char primary stepped Adolph Hitler with promises schools.
the German youth that if they would Hitleris follow him he would build a new German many which should not only revenue years. It itself upon the previously victorious no war star tions but which should in the end domi and her nate them; that instead of dwelling would be poverty, Germany would live off the to finally in of all the lands surrounding. With sud. The No. promises it was no trick to rally be rent to a younger generation to his standard σ people, y it was only the matter of α few year attitude of until German youth, under the bank their Gov of Nazism, dominated the German per American ple and started on the path of conquest their Gov

One of the clearest expositions of in children change that has taken place not only

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but is it December te Government but in the hearts and inds of the German people is presented y Hugo Ziemer in his book "Education or Death." Ziemer, a native-born American, was an educator and served for ome time as the head of the American chool in Berlin, during which time he was able to make a complete and thorough survey of German educational nethods.

He discovered that the schools of Germany are dominated completely by the party" of which Adolph Hitler is the red, and that education in Germany is evoted not so much to a clear undertunding of world history, geography, and the arts and sciences as it is to the application of the idea that the German seple are a superior race, that Adolph filler is practically a Diety, that being alized the workers in the Nazi party, and that the apportunity to "die for Hitler" in the German army is the greatest of all privileges.

and the dot of the primary grade books in American omises to be dressed at all times in their party uniforms; training in party work and methods is apparently more important than academic training; examples used in the school books deal with soldiers and guns and cannons instead German of the apples and other innocuous obpline was jects which are used as examples in the his char primary grade books in American schools.

Hitlerism has now been fed to the German children for some seven or eight years. It is obvious that, even had no war started as yet between Germany and her neighbors, as time went on it welling in would become increasingly difficult and finally impossible to live with Germany. The Nazi system is, of course, abhortent of all Christian and liberty-minded people, yet we can't help contrasting the attitude of the German children toward their Government with the attitude of the American children in general toward their Government. To educate American children by propaganda is unthinkable,

but is it not possible that we have failed

in a large measure to give our children a clear understanding of the precious value of liberty and of what American institutions mean to them? As Ziemer says "... Hitler's educational system, which has set itself the task of sweeping democracies from the face of the earth, is an even greater menace than his army or his Luftwaffe. If and when his present fighting force is beaten, then behind the military array we will perceive a younger army, even more fanatic than the soldiery of now—and this army too must be vanquished before Hitlerism will be destroyed.

"... if we are to combat the spirit of German youth with our own spirit of democracy, it will have to be a rejuvenated, revived spirit.... Are our boys and girls devoutly convinced that America is the one country which has something to offer to the world after it is free from Nazism, Communism, and Fascism? . . . We hear it said that respect for the flag and for the country must come without external stimulation; that patriotism cannot be taught. But Hitler is teaching it. ... Our Democracy, our heritage of freedom is worth getting a little excited about. We need not be ashamed to ask our youngsters to display the ultimate reverence for American ideals and American freedom. . . . Young Germany is awake and ready to die. Let young America and its parents, its instructors, and advisers be awake and ready to live."

Ziemer is right. In the early history of our country the colonists were willing to give their lives to establish a new nation under freedom because they knew what freedom meant. We of these later generations have lost sight of our heritage; thousands of university trained young men are, in a misguided attempt to be brilliant thinkers, trading their birthright for a mess of potage.

Education—the little red school house of America—is the very rock upon which our American liberty is founded; let us at least educate our children to appreciate what that liberty means.

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ber, 1941

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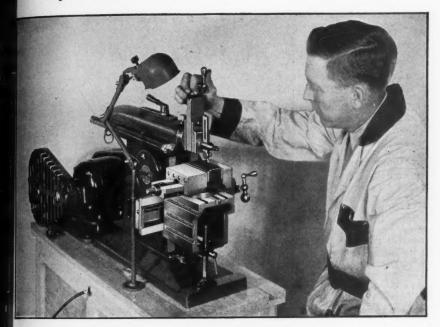
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## IT'S PORTABLE

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Don't tie up a big shaper when so many jobs can be done just as accurately and much quicker on the AMMCO 7"
PRECISION SHAPER . . . Available for stationary installation or mounted on portable cabinet easily rolled to the mechanic's workbench.

Features of this Shaper include quick adjustment of stroke, ram position, tool head, table height, table support, feed

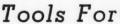
and speed ... The maximum length of stroke is 7¼" . . . Table has five cross feeds (reversible) . . . Countershaft has three-step cone pulley . . . 1/4 or 1/3 H.P.

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## National Defense

#### Onsrud Extrusion Miller

A high cycle extrusion milling machine which effects a saving in three and onehalf days production time per plane on the famous "Lightning" P-38 Interceptor is now in use at the Lockheed Aircraft Corporation Plant 2 in Los Angeles.

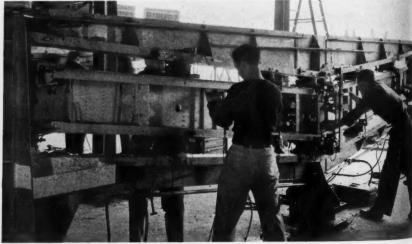
The machine was designed by Rudolph Onsrud in collaboration with the Plant Engineering Department of Lockheed, and built by the Onsrud Machine Works, Chicago, Ill. It is the first of its kind to be used in the aircraft industry as a means of speeding production of planes for National Defense. Lockheed has found that in its previous machining of ten

extrusions necessary for each P-38 mi plane it was necessary to expend a total of 90 production hours to what is now accomplished in the very short time of two hours and twenty minutes, for a saving of 87½ hours per plane.

Milling of long extrusions on tapen with cut-outs in flanges and various other cuts for weight reduction, and m on, has been quite a problem with all aircraft manufacturers. The length of the pieces made it quite impossible to put these extrusions on a conventional mil ing machine.

Lockheed set out to improve this condition by having a milling machine built for this purpose by the Onsrud company,

Center Section of Main Beam of Lockheed "Lightning" P-38 in Jig. The Upper and Lowe Channels Were Milled in the Onsrud Extrusion Miller. This Center Beam Carries the Emile Weight of the Airplane



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Close-Up View of Carbide Tip Cutter Used on the Onsrud Extension Miller. Soluble Oil is used as a Coolant and Lubricant, and Compressed Air is used to Keep the Chips Cleared Away while the Machine is Cutting

pioneers in high-speed machinery for non-ferrous metal cutting. From Onsrud's original design, Lockheed engineers incorporated certain changes that would more nearly meet their requirements, and the machine as redesigned and built for the Lockheed plant has stood up under use as an important aid to full speed ahead in the Defense Program as it pertains to the manufacture of the

world's fastest and most deadly fighting airplane.

P-38 mi

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This Extrusion Miller, as it is named, is 30 feet in over-all length, with a cutting area 12 inches wide and 20 feet in length. The carriage trav-

Leading a 20 - Foot Channel in to the Onsrud Extrusion Miller. The Machine Saves 87½ Hours Production Time on Each Plane Over the Method Previously Used

els on ways by means of rack and gear, giving a feed range of three feet to 18 feet a minute in either direction. This, of course, is variable according to the job to be done.

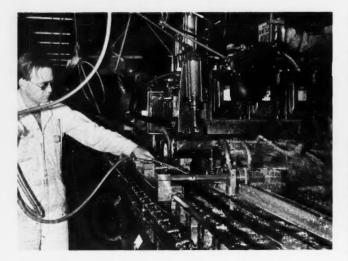
A platform about 15 inches above the floor is fastened on the back of the carriage, on which the operator stands, riding the carriage as it shuttles back and forth the full length of the cut. Two helpers on the floor meanwhile feed the extrusions into the machine and keep the chips cleared away. The motor control panel and air cylinder controls are on the platform convenient to the operator.

For channel cutting a steel fixture is provided with former bar attached which is secured to the table plates by means of bolts. Channel extrusions are placed in this fixture and held by means of air clamps which have a cam and dog on each, so that when released they turn out and up to allow easy removal of the part. Three cutting heads are used two vertical heads of 15 horsepower each at 10,800 r.p.m., mounted on shortarms which allow them to swivel to take care of in-and-out cutting conditions, and one horizontal motor of 15 horsepower at 5,400 revolutions per minute.

On this part one vertical head mills side cut-outs by means of a cam secured to the former bar. The other vertical head travels by a cam roller actuated from the same former bar as



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Onsrud High Content of the Carriage with the Carriage with the Carriage with the Workpieces in the Machine at Keep the Carea Awaren

the horizontal head.

Each former bar is machined on one surface the same as a finished part, eliminating any development work on these former bars. The cam rollers for each cutter are adjustable to line up the cutters perfectly so a true duplication will be maintained in the finished part. The cutter motors are then started and lowered by means of air cylinders to the former bars and the feed motor is then engaged.

Soluble oil is pumped from a trough under pressure to each cutter, thereby lubricating as well as cooling the work and cooling the water-jacketed motors.

An air compressor, mounted on the carriage and also cooled by soluble oil, supplies the air to actuate the air cylin-

ders. Cam dogs a placed on a rail underneath the se of the machine. The carriage in motion trips a bell crail which in turn act ates the air cylinder on the Resuder on the Resuder on the gottom or speeds up to carriage feed. In the carriage feed. In the carriage feed.

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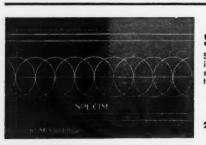
field.

With

cutter motors are reversible, which dows for climbing or backing out with either right or left hand cutters.

On other parts to be machined, when it is not practical to clamp with air, a roller carriage is brought into use whith travels on rails attached to the table tops. This arrangement holds the parts in this fixture uniformity and securely.

Carbide tip cutters are used exclusively on this machine, giving upward of 300 per cent better life between grinds better finish and less idle time. Due to the 26,000 pounds of weight and the accuracy of this machine, Lockheed is able to hold very close tolerances for this type of work, and upon completion of the P-38 contract it is planned to put many different types of machining of



## DYKEM STEEL BLUE Stops Losses in Making Dies and Templates

Simply brush on, right at the bench; ready for the layer in a few minutes. The dark blue background makes the scribed lines show up in sharp relief, and at the same time prevents metal glare. Increases efficiency and accuracy.

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December, 1941

High Cra Oper erator riage istants Fe kpieces chine the Chied Away

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EXAMPLES of the quality work done on one of the B.&S. Automatics at Whitney Metal Tool Co., Rockford, Ill. Whitney uses Texaco Cutting Coolants 100%.

TURNING, boring, threading high-grade alloy tool steel, the Whitney Metal Tool Co., Rock-ford, Ill., secured a 30-40% increase in tool life with no change in feeds or speeds . . . as one result of using Texaco Transultex Cutting Oil B.

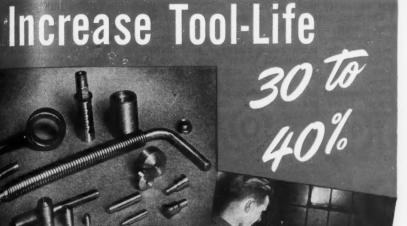
Transultex cools both cutter and work, thus preventing chip welding and assuring finer finish and increased life for cutters.

With Transultex the operator sees what he is doing, avoids jamming cutter and work.

The outstanding performance that has made Texaco preferred in the fields listed in the panel has made it preferred also in the metal-cutting

These Texaco users enjoy many benefits that can also be yours. A Texaco Engineer specializing in cutting coolants will gladly cooperate . . . just phone the nearest of more than 2300 Texaco distributing plants in the 48 States, or write:

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RETURN METAL DRUMS PROMPTLY. . thus helping to make present supply meet industry's needs and releasing metal for National Defense

this extremely versatile miller.

The work now being done in the Onsrud Extrusion Miller includes one upper and one lower channel for the center section of the main beam of the P-38, which is 20 feet in length. Other operations include the milling of eight cap strips, four left and four right, which are extensions of the channels into the wings. These are eight and ten feet long.

This machine has never been tested to its maximum cutting capacity although, to date, 42 cubic inches of dural

have been removed per minute.

#### Oilgear Gooseneck Presses

The Oilgear Co., 1320A W. Bruce St., Milwaukee, Wis., is now offering several styles of gooseneck presses in capacities from 6 to 25 tons, with controlled ram pressures, speed, and travel for fast, easy, and accurate forcing, stamping, broaching, assembling, straightening, and general manufacturing. For maximum utility on varied production requirements,

the presses are made with plain plates as shown in illustration Fig. 1, wi lower platens arranged to receive a tachable tables or fixtures, as shown illustration Fig. 2, and with deep work ing throats, large daylights and open ings on three sides so that they can be easily inserted into a production line in handling small, large, or long parts

Each press consists of a rigid, all-stee welded frame with integral pump on motor reservoir base; ring type pista closely fitted to a honed steel cylinder large ground and polished ram guide in a long bronze liner; built-in dim reading pressure gage; molded mapacking; enclosed control mechanism built-in coolant reservoir; mounting in vertical motor-driven coolant pump; à rect pump and motor drive, and sad or large Oilgear Type "DH" Two-Wa Variable Displacement Pump.

Two styles of standard sensitive controls are available. One, a servo-moto hand lever and foot pedal mechania provides sensitive control of the variable ram speed in either direction; the presure applied to the work and the di-



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Illustrating the flexibility of the Dazor Floating Lamp. Can be placed in literally hundreds of positions.

Yes, float this lamp to any position with the touch of a finger. It stays there. No adjusting or locking, because a spring scientifically counter-balances the arms.

You raise or lower the Dazor Floating Lamp in just a second. Push, pull or twist it; swing it in a complete circle—always the same firm, stationary light, exactly where you need it.

For shop work, localized light is essential: to curtail glare and eyestrain... to promote safety. The Dazor Floating Lamp fastens directly to lathes, drills, presses, shapers, milling machines, benches, drafting boards, desks, walls, business-machine stands—anywhere. Also, a portable pedestal type, as shown at left.

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INCREASE
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You can save time, increase tool life and improve tooled surface finishes by preparing your soluble coolants and cutting compounds with a "LIGHTNIN" Mixer.

Whether you "make-up" for individual machines or have a central circulating or cooling system, a "LIGHTNIN" of the proper size and capacity is available to solve this problem for you. "LIGHTNIN" MIXERS CAN BE READILY CLAMPED ONTO ANY TANK OR VESSEL. They have been successfully used in large plants for mixing cutting oils for over twenty years!

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MIXING EQUIPMENT CO., INC.

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tance of ram travel. Top and both limits of ram travel can be pressive repetitive cycles. Another control, servo-motor follow-up hand lever meanism, provides high speed approach a preset ram travel (preferably to was sensitive follow-up at a speed and a

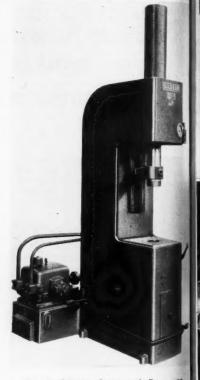


Fig. 1—Oilgear Gooseneck Press with Plain Platen

tance selected by hand lever movement and high speed ram return to a prest top position when hand lever is released

Three styles of special controls is meet specific production requirement are also available. One, a semi-automatic hand lever and foot pedal control causes ram to move downward at a preset speed to a preset point and the return automatically at high speed is starting position. Another, a semi-automatic control, provides automatic rates.

MODERN MACHINE SHOP

December, 1941

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# INCREASE TOOL LIFE WITH PROPERLY PREPARED COOLANTS

You can save time, increase tool life and improve tooled surface finishes by preparing your soluble coolants and cutting compounds with a "LIGHTNIN" Mixer.

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Fig. 1—Oilgear Gooseneck Press with Plain Platen

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Round and round they go—millions of them—doing every conceivable kind of grinding and polishing job in machine, pattern and die shops, tool rooms, defense plants, foundries, etc.

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They are made of the finest quality bortz and resinoid bond.

A wide range of standardized sizes and types of diamond wheels is on hand enabling you to select a suitable wheel to meet any ordinary requirements—for extraordinary results.

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J. K. SMIT AND SONS, INC. 157 CHAMBERS ST., NEW YORK

Detroit • W. Hartford • Chicago Cleveland • Seattle • Pittsburgh reversal when a preset working presure and tonnage is reached. A thin control to an Oilgear Type "DH" Pumpermits a preset pressure, up to making the property of the maintained on ram in finitely without excessive heating a power loss. The ram speed is variable in either direction and the holding passure is steplessly variable within the range of control.

Two sizes of Oilgear Type "DH" To

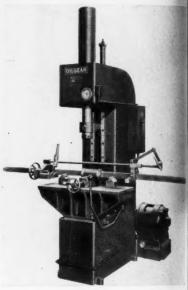


Fig. 2—Oilgear 15-Ton Type "PGRF" Gossneck Press Arranged for Straightening Mile Barrels

Way Variable Displacement Pumps are for general manufacturing purposes and available for each size press. One provides economical variable ram speeds the other, high variable ram speeds for greater production requirements.

Rifle barrels of varying lengths and diameters can be straightened on the Oilgear 15-Ton Type "PGRF" Goosenet Press shown in illustration Fig. 2. A spring balanced bar carries two overhanging brackets which support the barrel slightly above the resistance block of the press. Both brackets are needle

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HEAD

"UNBRAKO" KNURLED SOCKET HEAD CAP SCREWS

Yes...the head has it, and it's KNURLING — famous "Unbrako" feature for years and at no extra cost!

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Dry or greasy fingers gear right to dry or greasy knurls prevent annoying, time-wasting slip in the assembly line or when making adjustments.

#### "UNBRAKO" KNURLED SELF-LOCKING HOLLOW SET SCREWS

Set them up with only light pressure and they lock into place automatically with a positive, vibration defying grip. It's the KNURLED cup points that do it. Yet "Unbrako" Self-Lockers are as easily removed as applied, can be used repeatedly.

It will pay to make your next order "UNBRAKO."

## STANDARD PRESSED STEEL CO.

JERNINTOWN, PERRA. BOX 556

BOSTON - DETROIT - INDIANAPOLIS - CHICAGO - ST. LOUIS - SAN FRANCISCO

The KNURLING of Socket Screws originated with "UNBRAKO" years ago.



Fig. 1—Clearing Shell Forging Machine, capable of producing 240 ot 300 finish-drawn 99 mm forgings per hour, automatically, from steel billets.

bearing roller equipped and connected through a rod for convenient movement of barrel to right or left. The rifle bar-rel is deflected against two resistance blocks and the amount of deflection limited by a hand-operated wedge-type stop. A handwheel on the left-hand bracket rotates the barrel as gages on the table determine its straightness.

#### Clearing Automatic Shell Forging Machine

A four-stage completely automatic continuous-operation shell forging machine designed to produce from 240 to 300 finish-drawn 90 mm. shell forgings per how directly from hot steel billets, is a nounced by Clearing Machine Corportion, Chicago, Ill.

Eliminating all manual handling d the shell forging from the placing of the hot billet in the de-scaler until the firished drawn forging is ejected onto cooling conveyor, the new machine to quires less men to operate while produc ing from 3 to 5 times as many shell per hour as on upsetting machines of the older design.

In addition to combining in one auto matic machine operations frequently performed separately and eliminating manual handling, the new Clearing forging

## ANDERSON HAND SCRAPER and



One blade is equal to an ordinary hand scraper reforged about 5 times. When it is worn out a new blade makes a new scraper. Blades need stoning but no grinding. Blades are

15" thick from end to end and of correct hardness. Three sizes 3/4", 1", 11/4".
Try these fast, cost-cutting tools. Three sizes:

Write for complete details.

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## CROSSED AXES GEAR FINISHING

# Proves its Value in \*







Crossed axes shaving with a rotary cutter gives the ultimate in speed, accuracy and economy for correction

of index, helical angle and tooth profile of green gears.

Speed is due to high cutter speed with rapid stock removal. Accuracy is exceptional because action is independent of accumulated error in gear trains, indexing, etc. Fine cuts under light pressure remove compression strains and leave the tooth surface smooth. Less machine time and lower tool costs bring economy.

Also—the gear may be given the *Elliptoid* tooth form while being shaved—at no extra expense or time. This increases gear effectiveness and service life, decreases gear noise.

Write for descriptive Bulletin.

NATIONAL BROACH AND MACHINE CO.

\$600 ST. JEAN

DETROIT, MICHIGAN

December, 1941

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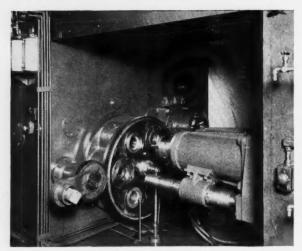


Fig. 2 — Clearing Automet. Shell Forging Machine for the loading side, with bills in loading carrier. Note coling stations between dies in the rotary indexing this. Lubricant tanks and cause control flow of the colleid graphite lubricant are shown at upper left. De-scaler as shown.

machine embodies a number of striking irnovations including: a rotary indexing die table, self-aligning punches and mandrel with automatic stripping, combination roller and ring dies for final drawing of the shell, automatic cooling of the punches and mandrel between each operation, and an automatic lubricating system for dies and punches designed for use of the new shell forging lubricants containing "dag" colloidal graphite now being made available na-

In the Clearing press a steel billet is converted into a finish-drawn shell in four operations. In the first operation, the billet is slightly upset to fit it firmly in the die and at the same time is lightly pierced. In the second, piercing is continued and the billet is changed

tionally by major oil companies.

from a square to a round form. In the third, piercing of the cavity is completed. The fourth consists of drawing the shell.

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All three piercing operations take place without the work being removed from the die in the rotary indexing table. Following piercing, the work is automatically

transferred from the die table to the drawing dies by means of a transfer carrier. In addition to the three dies, the die table has three "cooling stations"; one between each pair of dies Upon the return stroke of the punches the die table indexes 60 degrees, so that a loaded die and a "cooling station" are located alternately in front of each punch.

A summary of the sequence of operations is given in Table 1. The hot billet in the loading device is swung in trail of the die by the rotation of the die table to which the loading arm is geared. The first punch pushes the billet into the die on the first forward stroke, slightly upsets the square billet to seat it firmly in the die, and pierces the billet lightly.

On the return stroke the aligning



## New, Improved Line of **Power Feed DRILL PRESSES**



December, 1941

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MODERN MACHINE SHOP

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guide on the punch strips the work from the punch. At the end of the return stroke the die table indexes 60 degrees.

At the same time the second pun on the forward stroke, pierces the sh and converts it from a square to

TABLE 1

STROKE	FIRST	SECOND	THIRD	TRANSFER	DRAWING
	PUNCH	PUNCH	PUNCH	CARRIER	STATION
No. 1 Fwd. Return	Pierce No. 1 Strip No. 1				
No. 2 Fwd. Return	Cool Lubric.	Pierce No. 1 Strip No. 1			
No. 3 Fwd. Return	Pierce No. 2 Strip No. 2	Cool Lubric.	Pierce No. 1 Strip No. 1		
No. 4 Fwd.	Cool	Pierce No. 2	Cool	Load No. 1	
Return	Lubric.	Strip No. 2	Lubric.	Transfer	
No. 5 Fwd.	Pierce No. 3	Cool	Pierce No. 2	Unloading	Draw No. 1
Return	Strip No. 3	Lubric.	Strip No. 2	Return	Strip No. 1
No. 6 Fwd.	Cool	Pierce No. 3	Cool	Load No. 2	Cool
Return	Lubric.	Strip No. 3	Lubric.	Transfer	Lubric.
No. 7 Fwd.	Pierce No. 4	Cool	Pierce No. 3	Unloading	Draw No.2
Return	Strip No. 4	Lubric.	Strip No. 3	Return	Strip No.2

bringing a cooling station in front of the first punch, while the die containing the lightly pierced billet moves around in front of the second punch.

On the next forward stroke, No. 2, the first punch after being cooled in air on the return stroke passes through the cooling station, where it is cooled by a controlled hot water spray to bring it back to correct temperature. On the return stroke through the opening in the die table, the punch is evenly sprayed with colloidal graphite lubricant to lubricate it for the next piercing operation.

round shape of the die. On the return stroke the hydraulically-operated punch [MCED] guide strips the shell from the second steppin punch.

The die table now indexes over a other 60 degrees, bringing the forging in front of the third punch, a cooling sto tion in front of the second punch, and fresh billet in front of the first punch.

Upon the third forward stroke, there fore, the cavity of the first shell is it process of being finished while the in punch is piercing a second billet and the second punch is passing through a cool-



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TOOL ROOM PRECISION in PRODUCTION roachina BROACHING PAYS

THE JOB: To put machining of pump rotor slots on production basis.

THE METHOD: Broaching two slots at a time in two passes.

THE RESULT: Lower cost per piece, fewer machines, tool room precision in production.





CACED with the problem of I stepping up rotor producon for precision hydraulic mps from a-few-at-a-time to apacity of several thousand er month, broaching was and to provide the answer to low-cost production accuracy.

On a job-lot basis, these slots only about 5/64 inch across are held to plus or minus wo and one half ten thouandths with greater ease and iformity by broaching than it was possible to hold the me parts, a few pieces at a time, by milling.

Even if the job could be done

15 well, it would have taken quite a few milling and drilling machines to do the same job is the single two-broach equipped Colonial.

More details on this operation are to be found in the current issue of "Broaching News". We'll be glad to send you a copy. Ask for issue No. 10.

COLONIAL BROACH COMPANY

147 JOS. CAMPAU ST. DETROIT, U. S. A.

ing station. The second punch is spraylubricated on the return stroke, while the shells are being stripped from the first and third punches.

On the next forward stroke, No. 4—after the die table has again indexed 60 degrees—the now finish-pierced shell is pushed out of the die into a carrier (Fig. 3) from the rear of the die while, the third and first punch are being cooled and lubricated, the second punch is piercing, and the loading carrier is in position to receive another hot billet.

The next time the die table indexes, the transfer carrier—also geared to the die table, and now containing the pierced shell—is swung up in front of the drawing unit. On the next forward stroke (No. 5) the drawing mandrel enters the shell and pushes the shell through a set of roller and ring dies which draw the shell to its proper size.

On the return stroke the finished shell forging is stripped automatically from the mandrel and delivered through a chute back of the drawing dies (Fig. 3) to a conveyor for cooling.

The next indexing of the table swings

the transfer carrier back into position receive the second finish pierced the On the next forward stroke (No. 6), to drawing dies and mandrel, now pausidly through the dies, are sprayed to a mixture of air and water to cool the On the return stroke they are spray with a lubricant containing the "ag colloidal graphite, similarly to a punches.

Further indexing of the table in brings the die in which the first shell in been pierced into position to reconstruction to reconstruction to this, however, had been carried by the indexing of table to, first, a position in front of air jet which thoroughly cleans out in die, and second, in front of a lubricant jet which sprays it evenly with the a loidal graphited lubricant.

### Design Features

Not shown in Fig. 2 is a de-tail which may be provided ahead of a cutomatic die loader. In this case in billet is placed in the de-scaler who the scale is automatically removed in the billet. A special device scrapes in



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December,

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# **Drills have been on the Front** Line of Defense.

In times of stress, when the demands placed on industry are extraordinary— Clark Electric Tools and Drills are doing their part. Clark products give trouble-free operation under the toughest working conditions. The master workmanship, supreme quality and extra performance built in every Clark tool accounts for their remarkable performance records.

first in Quality is a well-earned description of Clark tools. Let it be your guide to complete satisfaction when selecting drills, sanders and grinders.

> JAS. CLARK, JR. ELECTRIC CO. 606 BERGMAN ST., LOUISVILLE, KY.

# **Change ANY Engine Lathe** to Production Turret Lathe



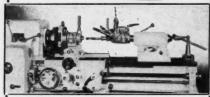


Photo shows Turrets on 16" Lathe

15 seconds and an ordinary wrench are all you need to attach the Jefferson 5-Tool Tail-Stock Turret onto the outside diameter of the tailstock spindle of your engine lathe. Turret head accommodates five tools and each tool centers automatically when brought into position by means of an indexing plunger. For forming, roughing, boring, finishing, drilling, tapping, etc. Made in four sizes to fit small bench lathes up to lathes with 20" swing.

Write for complete details.

Delivery - 10 days.

When ordering new lathes, be sure to specify Jefferson Turrets.

We also manufacture Tool-Post Turrets, Pull-Feed Levers, Milling Machines, Belt Sanders, Swing Frame Grinders and Gyratory Foundry Riddles. Write for literature.

## JEFFERSON MACHINE TOOL CO.

750 W. Fourth St.

Cincinnati, Ohio

piercing end of the billet, products clean metal—a protection against so spots in the cavity of the shell. From the de-scaler the billet is automatical transferred to the dies through the lost ing carrier.

Index operation of the die-table is no vided through a Geneva drive, while set of toggle links produces the proper dwell of the anvil that closes the bar

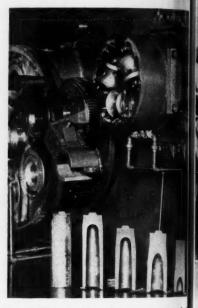


Fig. 3—The drawing dies are composed combination rollers and rings. Below the dring die are shown, right to left, the billet are leaving the first punch, after leaving the wond punch, after finish piercing and are drawing. An unsectioned shell forging is the extreme left. Note the chute in back of drawing dies from which finished forging drop onto a conveyor to cool.

end of the dies while the billets are is

ing pierced.

The lubricant for the punches brought to the cooling stations in the die table through drilled holes from central connection through which the lubricant enters through packing glow of lubricant to each cooling station, as well as flow of water for owing is controlled through cams.

All three piercing punches, with the

egripped for VERSATILITY

"REED-PRENTICE" Geared Head Lathe . . . Bijur-Lubricated

• Improved machine versatility is demanded . . . greater capacity . . . closer accuracy . . . faster speeds. Modern machines must be adequately protected. More and more they rely upon correct, automatic lubrication—BIJUR "built-in" equipment. BIJUR LUBRICATING CORPORATION . LONG ISLAND CITY, N. Y.

AUTOMATICALLY Correct LUBRICATION

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combination self-aligning guides and automatic hydraulic strippers, are mounted on the same head. The drawing mandrel is located on a separate head, but both heads move simultaneously. The reciprocating motion of the punches and mandrel is obtained mechanically through large eccentrics, driven through double gearing, in turn, from the machine flywheel. The latter is driven by a 150 h.p. motor through V-belts, and the drive unit is equipped with a solenoid controlled pneumatic clutch interlocked with a brake in such a manner that when the clutch is "on," the brake is "off," and vice-versa. Operation of the entire machine is through four conveniently located start and stop buttons.

From the 110-gallon reservoir, the lubricant is piped to two metering tanks shown at the top of the machine in Fig. 1. On top of these metering tanks are venturi passages in which the lubricant is mixed with air. Release of air pressure to each line is controlled by the cams above the tanks, these being timed with the machine to permit the sprays

to go off and on at the proper interval One cam controls flow to the die to to lubricate the punches, another to line to the jet in front of the "empty in station just ahead of the loading pa tion, while a third line carries lubra to the drawing die, where it is actual during the return stroke while that is is empty, to lubricate both the die m mandrel.

Fig. 1 shows the complete machine For every six strokes it produces the completed shell case forgings, so be each shell (at the 240 per hour rate) in the machine a total of around seconds. Since the time for all shells identical, close control as to size a uniformity are possible.

Warner & Swasey Turret Lathes. 16-page catalog describing and illustrate ing Warner & Swasey Ram Type Hig Speed Electric Turret Lathes, Ra Type Turret Lathes with all gean head, and Saddle "A" Type University Heavy Duty Turret Lathes has been meleased by the Warner & Swasey 0, 5701 Carnegie Ave., Cleveland, Ohi Copy free upon request.

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### CAM VISE

Precision built for rapid production work.

Hardened and ground jaws: width, 4" and 5"—depth, 1½"—maximum opening 2" and 3". Square key slots in base at right angles.

## SWIVEL VISE

For milling machines, shapers and drill presses.

Hardened and ground jaws: width, 4" -depth 1½"—maximum opening 3". Key slots, 3/8" x 1/8" deep. Detachable base graduated in degrees.

WRITE FOR FOLDERS.



December, 1941

Here's ONE substitute that's actually an improvement!"

★ The word "substitute" in a great many minds means something inferior. That's far from the case with DBL H.S. Steel. DBL fully replaces 18-4-1 in performance. It cuts as well or better in 85-90% of all casesyou won't lose a single minute's production. It heat-treats in the same equipment and by the same methods as 18-4-1, too-you'll have nothing new to learn, and nothing new to buy. And, as a bonus value, DBL costs less than 184-1 and is somewhat lighter -you get more pounds per dollar, and more tools per pound. • Changing over to DBL High Speed Steel actually brings you advantages! All you need is the "DBL Blue Sheet," which contains full technical data. Mail the coupon below for your copy.

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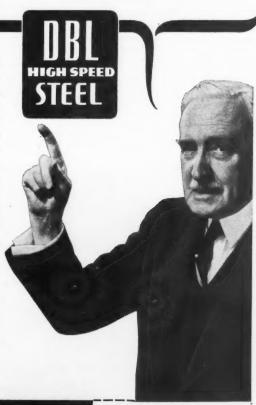
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# ALLEGHENY LUDLUM STEEL CORPORATION PITTSBURGH, PA.

Tool Steel Division



Allegheny Ludlum Steel Corp. Oliver Building, Pittsburgh, Pa.	T-168
Send me a copy of "DBL Blue Sh	eet."
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### Shields No. 3 Vertical Milling Machine

The Shields No. 3 Vertical Milling Machine shown in the accompanying illustration has been brought out by the Shields Mfg. Co., Inc., 38-11 24th St., Long Island City, N. Y. The machine has eight spindle speeds, with motor and gearing built as an integral unit with the spindle assembly. A 1,200 r.p.m. 1½ h.p. motor operated by a start and stop and left or right-hand switch on the head drives the spindle either directly through a four-step cone or through helical back gears at speeds of from 72 to 1,630 r.p.m. in geometris progression.

Ver

The spindle is supported by due Engineer super precision ball bearings at a straid de nose, a ball bearing in the middle, a de speed another at the end. It has a staning to clot No. 40 taper. The spindle pulley is a ch Shap ported by its own two ball bearings a ought or drives the spindle through a point is E. 51 clutch or the back gears. The circle the and back gears run in oil. One-eight erated uto %4-inch end mills can be used to one-grain the spindle is driven directly by the strateg and up to 6-inch face mills are as an are driven when the spindle is in back gas The hear The spindle slide can be moved good so inches by a handwheel well ing through a worm which a

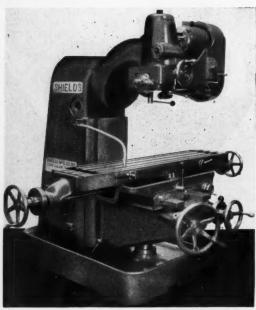
ing through a worm which a be disengaged for quick oper

tion by lever. A four-positi stop on the slide can be us for step milling or boring. The head can be turned

deg. forward or backward the column by means of crank operating through worm wheel and locked by single nut. The head can a be swiveled 360 deg. on the a umn by a crank operati through a worm and locked a single nut at the rear of the column. The two swivels h flanges scraped to fit w keep the swivels snug in housings when the loo nuts are loosened.

The table has a working face of 12 x 56 inches, ver travel of 14 inches, cross to of 12 inches, and 30-inch budinal feed. Feeds and rapid traverse are to the only. Power rapid traverse 100 inches per minute.

A small handwheel on the and enables an infinite varia tion. A dial behind the wh indicates the rate of feed. A



Shields No. 3 Vertical Milling Machine

Decembe

motor is mounted in the saddle and wides the drive through two variable ed pulleys. The feed gearbox runs in oil bath.

all dials are 6 inches in diameter. A h.p. coolant pump is mounted in the , which has an extra large reservoir th separating chamber and door to mit cleaning out of chips. The spin-slide, table saddle, and knee can be ked in position, and all ways are proted by Neoprene wipers inclosed in ss housings.

### Vernon 12-Inch Shaper

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d by due Engineered to meet toolroom and inrings at a strial demands for a shaper having
middle a de speed ranges and capable of works a stand to close tolerances, the Vernon 12pulley is a ch Shaper shown herewith has been
bearings a cought out by the Machinery Mfg. Co.,
h a posit is E. Sist St., Vernon, Los Angeles,
The cluical. The machine is a compact, easily
One-sign erated unit with all castings selected,
e used who re-grained cast iron. Castings used
city by be strategic parts subject to stress and
is are eas rain are normalized.

In back got The heavily ribbed V-type ram is deoe moved got to the tit has a 60 per cent bearwheel weit

ing surface when it is at extreme stroke and completely forward in ram bearings. The supporting column is substantially ribbed with unusually wide dovetails. The massive cross rail is stress ribbed, and a tapered gib maintains uniform bearing surface and permits easy adjustment. The table is of box-type construction with three Tslots on top and two on the side. A V-slot for shaping bars is also provided. The cross feed is automatic in both directions, cam actuated, and accurately synchronized with the return stroke of the ram. Seven speeds ranging from 0.0025 to 0.0175 inch are available.

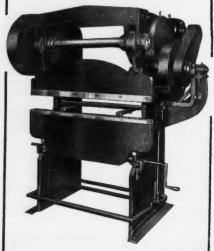
An infinite number of speeds within a range of 15 to 170 strokes per minute can be obtained by the variable speed drive, which enables speed changes to be effected instantly without stopping the machine by turning an easily accessible handwheel. The quick-change gearbox and drive pinion are built as an integral unit. Heat-treated, alloy steel gears, ball bearing mounted and running in oil, enable gear changes to be easily made by sliding the inching wheel in and out. All gear shafts are hardened and ground.

The helical type bull gear is mounted on large Timken tapered roller bear-



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No. 253



## Does 40% to 60% of the forming work turned out by the average shop.

Here's a profitable, economical brake ideally adapted for rapidly forming metal sections such as in stoves, refrigerators, soda fountains, steel cabinets, metal furniture, steel boxes, and a great variety of sheet metal specialties. Its variable speed drive operates from 17 to 50 strokes per minute. The No. 253 CHICAGO STEEL PRESS is accurate. compact, and ruggedly constructed of highest quality materials.

Sizes 4, 5 and 6 ft. capacities up to 10 gauge. Write for Circular No. 253

## DREIS & KRUMP MFG. Company 7418 LOOMIS BLVD.

CHICAGO

ILLINOIS

ings, thus permitting adjustment wear and adequately absorbing radial and thrust loads. The bull g is so positioned in relation to its be ings that overhang is kept to a mi mum. The center distance between gear and pinion can be adjusted tooth wear.

Other outstanding features of the chine include friction-type dials quick adjustment, accurately gradus to 0.001 inch. Bronze and felt wip are provided for all dovetails. The in



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Vernon 12-Inch Shaper

head has a tapered gib, and the ti post is of forged steel.

Specifications of the Vernon 12-in Shaper are as follows: ram-maximi length of stroke, 12% inches; length ram, 31 inches; length of ram bear in column, 22½ inches; width of m bearing in column, 7½ inches; num of strokes per minute, 15 to 170; return ratio, 3 to 2; table-cross (automatic in either direction), linches; vertical travel, 7½ inches; dimensions, 10 d x 12 inches; dept. 10 d y inches; head—vertical travel. inches; size of tool post slot, h x inches; diameter of head, 6½ inche vise—width of jaws, 7 inches; depth jaws, 11/2 inches; jaws open, 5% int

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he shop with a Bullard I.L. is in a position to mept National Defense b-contracts for parts with outside its usual he because the versatily of the machine is so real that even its owners on to always realize its mage of work. For exmple:

- 1. Turn
- 2. Face
- 3. Bore
- 4. Cut-off
- 5. Drill
- 6. Ream
- 7. Tap

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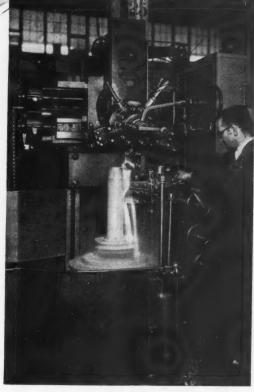
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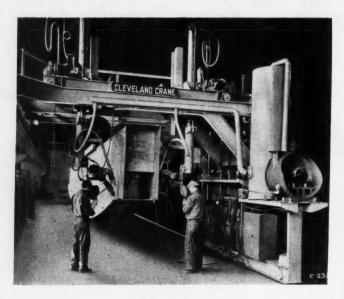
- 8. Form
- 9. Crown
- 10. Neck



nd because its vertical and horizontal heads operate indeendently but simultaneously, it will do most any two of these bs at once. Every job or production shop with work suitable to turret lathe can make profitable use of a Bullard V.T.L.

# THE BULLARD COMPANY

BRIDGEPORT, CONNECTICUT



Cleveland Automoting Garder for 1844 Capacity Cres

height over table, 4 inches; motor, 60 cycle, 1,150 r.p.m., 1 h.p.; floor space required, 24% x 52% inches; weight, 1,060 pounds.

### "Cleveland" Automatic Welding Gantry

The Cleveland Crane & Engineering Co., 1111 E. 283rd St., Wickliffe, Ohio, has designed and installed in its Structural Department an automatic welding gantry for making long welds of from 1 to 120 feet continuously and automatically. This equipment replaces the world's first welding gantry, also conceived and constructed by Cleveland

Crane. The agantry has me novel feature which are said make possible ter welds, eas operation, and a proved works conditions for a operators.

The gantry abe traveled at a speed from 30 i 148 feet per he to suit variousize welds an materials. As the gantry travels, the welding rod is he

precisely and automatically to be sides of the work. In the welding has a tape is wrapped around the rol be shield the arcs.

By welding both sides of the weat the same time, the welding heat idistributed evenly, thereby neutralish stresses and minimizing distortions the otherwise would take place and the producing straight, accurate welds. The welding heads are raised or lowerd windividual push button-controlled motorized drives that are mounted a separate hand-propelled trolleys which may be adjusted to suit the width of the work.

the gantry are a motor-generator of for actuating the welding arcs, in

# Here's a Real Spring Winder!

No. 1 Capacity 0 thru 3/32" wire, \$1.25 No. 2 Capacity 0 thru 3/16" wire, 2.50 No. 3 Capacity 0 thru 5/16" wire, 5.00



Will Earn Its Cost In One Day The HJORTH Perfection Spring Winds offers the ideal means of winding extesion, compression, torsion, taper, double taper, or left hand springs. Try one is your shop. You'll like it and the prist is reasonable.

HJORTH LATHE & TOOL CO. 12 BEACON STREET

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STREET MASS

per, 1941 December, 1941

# Every MACHINE SHOP EXECUTIVE Needs this New KENNAMETAL Catalog to Cut Steel Profitably

Specifications and prices for thirty-five styles of standard tools in many shank sizes and 177 standard blanks are listed in the new KENNAMETAL Catalog No. 42. In addition, typical applications for each style of tool are clearly illustrated by line drawings, photographs and information on specific examples of the use of KENNA-METAL have been included. The new KENNAMETAL round shank boring tools, cut-off tools, roller type turning tools, and solid round tools are illustrated and described.

KENNAMETAL Catalog No. 42 is the most complete carbide tool catalog and manual ever published. Send for your copy today.



Standard and Modified "Standard" KENNA-METAL tools are shipped within 10 days of receipt of order; Standard blanks within 3 to 4 days. Order Standard tools and blanks and save timel

### **Contains Valuable Engineering** Data for Users of Steel Cutting Carbide Tools:

- Materials machined with Kenna-METAL and grade selection.
- Selection and design of tools.
- Grinding of tools.
- Chip breaker designs.
- · How to avoid grinding cracks.
- Brazing blanks to tool shanks.
- Typical turret lathe set-up using standard tools.

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Please send me your new KENNAMETAL Catalog No. 42.

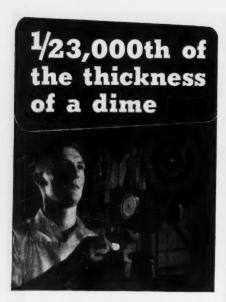
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Company



MODERN MACHINE SHOP

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MAGINE slicing a new dime 23,000 times. Each sliver would measure approximately two-millionths of an inch thin. There are Johansson Gage Blocks which are accurate within two-millionths of an inch! Small wonder that Johansson Gage Blocks and Accessories are regarded as a prerequisite for accuracy in much defense production.

## FORD MOTOR COMPANY

Johansson Division (Dept. G) Dearborn, Michigan





welding transformers, and control, we switches and meters. On this leg is a mounted an air-filtering unit which means of suction nozzles placed at welding heads, removes the welding smoke and makes for more health working conditions.

Provision has been made for exconnecting-in hand welding equipme to make use of the welding transform during periods when there is no we requiring automatic welding, or places where hand welding is desirab

The Cleveland Automatic Welds Gantry is of rigid all-welded steel as struction and is provided with mis bearings throughout. It travels on rails, one located on the wall and to other set into the floor. The transcorr drives wheels on both rails at thus assures even straightline transcorr deliminates the possibility of an orane skewing action.

The illustration shows a girder in a 150-ton capacity crane being welded. This girder weighs 90,200 lb. and a span of 105 feet. Plates used for a girder range in thickness from 1 11/4 inches.

## Frankel Type 2 FR Single Spinds Semi-Automatic Machine

A single-spindle semi-automatic turn lathe the design of which includes some unusual features has been placed on the market by Frankel Machinery Corportion, 118 East 28th St., New York, N. The outstanding feature of the machine is the large faceplate-like turret which is made to revolve around a horizonth axis instead of the usual vertical mounting, thus eliminating the customary cross slide. An auxiliary cross slide, however, may be attached if no essary. The turret, which is 15 inches in diameter, provides for 16 tool positions near its circumference, thus making the machine particularly adaptable for jobs upon which many operation are required.

The method of supporting the turn permits the use of a large and low pivot bearing, which increases the rigid ity of the toolhead. A powerful as rigid toolhead locking is provide through a well-supported locking working on a radius larger by 1% inches than the radius of the tool holes.

The Frankel Type 2 FR Semi-Aub matic Machine is designed for use with all standard lathe tools. Chuck with hei

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# here Haste Makes Waste..

yskilled workman knows, toolmaking is a matter of infinite patience and scrupulous and Nojeweler fashioning some beautiful but useless bauble ever worked with greater than do the craftsmen who make the Starrett Precision Tools which are so essential often industry.

ajob that can't be rushed. Greater efficiency, new methods, additional equipment and imployment of every available trained and experienced toolmaker help a lot, but time lithe essence of accuracy.

ut tool dealer is unable to supply you promptly with the Starrett Tools you need, mber that we who make them must still work carefully and slowly in order that you use them may work swiftly, surely and confidently.

ELS. STARRETT CO · ATHOL · MASSACHUSETTS · U · S · A · World's Greatest Toolmakers

# STARRETT

ISION TOOLS . DIAL INDICATORS . GROUND FLAT STOCK

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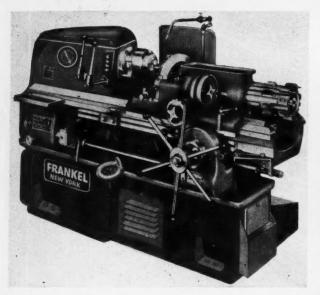
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Frankel Type 2 FR Sin Spindle Semi-Automo Machine

up to 20 inches is economically machined by the use of gooseneck tools.

Eight feeds are available without changing back gears. Feeds can be multiplied by changing back gears, and a spring-operated overload safety device is provided to prevent gear tooth breakage. The feed shaft drives a falling worm through a pair of gears, and the falling worm drives a worm gear which, in turn, through a pinion and rack feeds the toolhead unit longitudinally.

The automatic feed can be tripped very precisely by means of stops which make the worm fall, thus assuring maximum precision while working to shoulder. The automatic cross feed is

effected by auxilia shafts and bere gears to the ge face of the tool Feed reverse is vided by means of bevel gear. The tomatic feed is gaged and gaged by friction clutch, the wheel feed is a fected by turn handwheel. The feed is limited l stops adjustal mounted on the head.

A vari-drive unit providing an infinite number of speeds from 37 to 1,270 r.pm. in two ranges-high and low-is mo ed in the base of the machine and is easily accessible. The pulley on the spindle is mounted on separate roll bearings and is driven by a "Veelor v-belt, thus making possible is speeds and smooth vibrationless turn Power to the high and low ranges of spindle speeds is transmitted by means of a shifting device and expansion clutch. Only one lever controls the high and low speed ranges of the spindle the variation in each range being ob tained by turning a handwheel located on the base. An automatic lubrication system is provided, operating from the



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## December, 1941

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In view of their

potential impor-

ince in defense production, the new refrigerating units are being made available in several capacities for use with other makes of welding ma

# Now . . .

# ICE-COLD WELDING

EVEN FASTER production welding of aluminum than already made possible by Progressive's 3-phase Short-Wave welder is now forecast as the result of a development enabling welding at tip temperatures well below freezing.

Compared with the usual 40 or 50 spots between point dressings, continuous runs without point

cleaning for 10 minutes at 100 welds a minute are no longer unusual with the combination of Progressive's Aluminum Welder and the Progressive refrigerating unit.

(At top, unretouched photo immediately after a welding run. Center, Progressive's 3-phase Short-Wave welder. Below, right, the refrigerating unit.)



Progressive Welder Co.
3023 E. Outer Drive Detroit, U. S. A.

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MODERN MACHINE SHOP

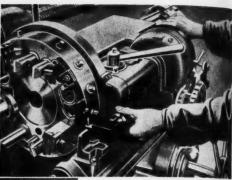
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headstock of the machine.

The bed is mounted on a full length box-shaped base to prevent warpage. Deformation of the bed due to stress of the cutting tool is completely eliminated by specially formed ribs.

Specifications of the Frankel Type 2 FR Single Spindle Semi-Automatic Machine are as follows: swing over ways,

A Stop Drum with Longitudinal Stops Controls the Action of Each of the Tools



The Tool-Head, Which is Adapted for Standard Tools of the Box of Shank Type, Is Equipped for Creat Feed

feeds, 16 each; longitudinal feeds, 0.00276 to 0.091 inch; cross feeds, 0.0025 to 0.665 inch; weight of complete machine with motor, approximately 6,000 lb. The machine is supplied complete with chip tank and motor-driven coolant pump.

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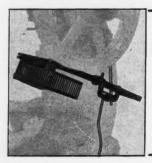
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20 inches; maximum distance between spindle flange and toolhead, 28% inches; maximum distance between automatic chucking device and toolhead, 21 inches; spindle bore, 2% inches; bar capacity, 2 inches; toolhead diameter, 14½ inches; diameter of circle of tool holes, 9% inches; number of tool holes, 16.

Number of spindle speeds, infinite; range of spindle speeds, 37 to 1,270 r.p.m.; number of longitudinal and cross

### Oster No. 601 Turret Lathe

Designated as the No. 601, a motordriven turret lathe with hand feed to cross slide has been brought out by The Oster Mfg. Co., 2061 E. 61st St., Cleveland, Ohio. The lathe is equipped with a six-position turret having six 1½-incl diameter tapped holes in each turret face for mounting various sizes of toolholders. If the hexagon turret is not



214

# SAFETY EQUIPMENT FOR POWER AND FOOT PRESSES

Combination Gate and Barrier Guards Two-Hand Safety Starting Devices Sweep Guards...Single-Stroke Attachments Treadle Guards...Fly Wheel Guards, etc.

Write for Details

JOHN HUMM SAFETY EQUIPMENT CO. 251 SHEFFIELD AVE. BROOKLYN, N. Y.



"Go shopping" — without leaving your plant. See, handle — test the performance of new tools on actual jobs — before you buy. At your request a Snap-on factory representative will call at your plant, display and demonstrate any tool in Snap-on's line of 3000 styles and sizes. You'll "see" more than glittering finish — the Snap-on way. In the atmosphere of real work to do you'll appreciate the safe toughness of

Snap-on steel — the precision of Snap-on design and manufacture that insures accurate, non-slip handling, fast, sure workmanship. For full information and free demonstration write...

#### No. 477 Y PLANT MAINTENANCE SET

Every possible handle hook up from midget sliding bar to heavy duty 6" head ratchet. 28 Double-box sockets from ¾" to 1%".





SNAP-ON TOOLS CORPORATION

8032-L 28th AVENUE

KENOSHA, WISCONSIN

December, 1941

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MODERN MACHINE SHOP 215



required, the machine can be furnished with a plain saddle on which a variety of tool posts or other fixtures can be mounted.

Among the many operations performed by the machine are boring, reaming, threading, facing, and cutting-off. The automatic chuck has a capacity for a 1½-inch round bar, 1½-inch square bar, and 1 ½-inch ex bar. The swing over bed is 14 inches and the swing over cross slide is 6½ inches. The carriage travel is 11 inches when there is a cross slide on the 33-inch main ways. The maximum movement of screw feed cross slide is 6½ inches and the maximum movement of lever feed cross slide is 4½ inches.

The Oster No. 601 Turret Lathe is furnished with either worm drive or direct drive, depending upon the required range of spindle speed. In the

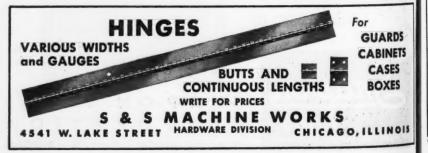
worm drive, the hardened and ground steel worm, like the spindle, is mounted in ball bearings transmitting smooth, even flow of power through a bronze worm wheel to the spindle. Due to this smooth flow o power, the machine can make unusually heavy forming cub with absence of chat-

In the direct drive for high speed work on small diameters and non-ferrous melals, the machine is equipped with a two-speed, 2 h.p. motor, manually

two-speed, 2 h.p. motor, manually controlled, which drives the spindle through triple V-belts. Quickchange shear and the two-speed motor provide a range of spindle speeds up to 3,000 revolutions per minute.

### American No. 2 Plain Milling Machine

J. L. Lucas & Son, Inc., 1 Fox & Bridgeport, Conn., has brought out the American No. 2 Plain Milling Machine shown in the illustration. Modern is design and appearance and well suited to a wide range of present-day milling needs, the machine is provided with a heat-treated chrome-nickel steel spindle



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rive, the and ground n, like the smounted bearings, itting a ten flow of arough a porm wheel dle. Due to the flow of the machine unusually

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Milling

Fox St., at out the Machine Iodern in rell suited by milling and with a el spindle

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Butterfly Filing and Sawing Machine
(Die Making Machine)



Price MODEL EL

\$145.00 Net Including

MODEL No. 16 Special

\$225.00 Net Including Motor.

Saves 50% or more in cost of sawing, filing and lapping on dies, gauges, tools, etc.

Surface Table On Model D - - - 10" x 16"

Model EL - - - 12" x 12"

Model No. 16 - - 16" x 16"

PROMPT DELIVERY

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VICTOR MACHINERY EXCHANGE, INC.

251 CENTER STREET

NEW YORK, N. Y.



The LIBERTY High Speed Grinding Attachment fits Brown & Sharpe, Reid and other makes of surface grinders.

1. Grinds slots, recesses and surfaces, etc., which are impossible to reach with large wheel.
2. Eliminates expensive set-up time in which small wheels are necessary. Takes only a few minutes to attach.
3. Handles wide variety of tool, gage, die and other grinding.
4. Extreme accuracy—precision bearings throughout.
5. Spindles of both vertical and horizontal attachments can be shifted to numerous positions.

Assembled complete with any size bores, pulley, belts and grinding wheels at no extra cost.

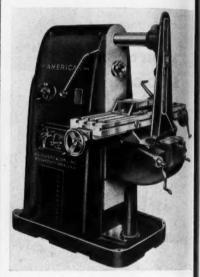
Write—specifying diameter of spindle head, type and make of grinder.

LIBERTY
TOOL & GAGE WORKS
235 GEORGIA AVE. PROVIDENCE, R. I.

having a standardized flanged spinds nose with No. 40 taper. The spinds which is accurately ground to size, run in heavy phosphor bronze bearings conpensated for wear and equipped with Alemite lubrication fittings.

The machine is driven by means at a 3 h.p. U. S. Vari-Drive Motor located in the base. The motor has ball bearing throughout and is designed for operation on either 220, 440, or 550 volt, 25, 30 or 60 cycle, 2 or 3 phase alternating current.

A full range of spindle speeds from 3



American No. 2 Plain Milling Machine

to 500 r.p.m. can be instantly obtained while the machine is in operation by a single direct reading dial control. All operating levers are centrally and conveniently located for ease and efficiency of operation.

The table of the machine is ruggedly constructed for long life and has both power longitudinal and power transverse feeds. The working surface is provided with large size oil pockets and three T-slots.

The column, a heavily proportional three-point structure of high steel content, completely houses the motor drive and all power shafts.

Specifications of the American No.: Plain Milling Machine are as follows: table—working surface, 46 x 10½ inches; number of T-slots, 3; size of T-slots.

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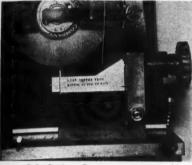
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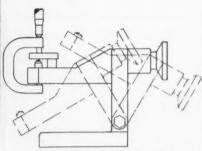
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# New C-66 RADIUS DRESSER for SURFACE GRINDERS

A low-priced, rugged attachment for any make of surface grinder. Mounts directly on magnetic chuck. Dresses wheel without dismantling machine—a one hour job in 10 minutes.

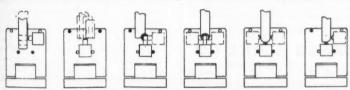


C-6b Radius Dresses torming temale radius.



Setting diamond with micrometer for accurate radius.

The C-66 will accurately dress wheels to both male and female radii. Operation is open and easy to see. For dressing wheels for grinding turning tools, the dresser is set at angle equal to clearance angle of tools. The C-66 is the only radius dresser with this feature.



Drawings show: dressing to width; 90° and 180° female dressing; 180° and 90° male dressing.

Prompt delivery from factory in Newark. Sold on 10-day Free Trial. Price, without diamond, \$72.50. 1/4 K diamond, \$5.00.

# SCHULTZ & ANDERSON CO.

MACHINE TOOLS

174 FERRY ST.

NEWARK, N. J.

219

% inch; range—longitudinal, power feed, 25 inches; transverse, power feed, 9 inches; vertical, hand feed, 19 inches; maximum distance center of spindle to top of table, 19 inches; minimum distance center of spindle to top of table, 0 inches.

Full width from face of column to arbor brace, 21½ inches; standardized flanged spindle nose, No. 40 taper; diameter of hole through spindle, 21/32 inch; length of front bearing, 5 inches; diameter of front bearing, 2½ inches; number of spindle speeds, infinite; range of spindle speeds, 25 to 500 r.p.m.; ratio helical back gears, 5 to 1;

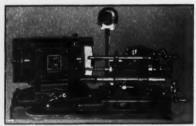
number of geared feeds, 16; range per revolution of spindle, 0.005 to 0.212 inch overarm diameter, 3¾ inches; distant to center of arbor, 6½ inches; flow space occupied by machine, 85 x with inches; net weight, approximately 33m lb.; shipping weight, 3,750 pounds.

# Progressive Refrigerating Unit In Aluminum and Stainless Steel Welders

Designed to increase productivity of resistance welding equipment in welding aluminum and stainless steel, as frigerating unit for use with Progressive Aluminum and Stainless Steel Welding Machines and other makes of welding Machines and other makes of welding Machines and other makes of welding to the progressive Welder Co., 3050 E. Outer Dring Detroit, Mich. When used in combination with a spot welding machine, the unit is said to reduce electrode temperature to a point where, in spite of the high heat necessary to produce a weld the electrodes will be continuously covered with frost. According to the manufacturer, this reduction in temperature so increases point of life that continuous 10 minute runs at 100 welds per minute without point dressing are not unusual for the combination of a Progressive Three-Phase Aluminum Welder and the refrigerating unit.

Primary function of the refrigeration is to keep the welding point cool at the point of contact. In resistance welding, heat is generated at three primary resistance points; namely, (1) at the point of contact between the pieces being welded together, (2) at the point of contact between the upper piece and upper electrode, and (3) between the lower piece and the lower electrode. Only the first condition, of course, is desirable, the other two tending to

# A Dull Tap Ground is a Sharp Tap Found



Don't discard your dull taps! Keep them sharp on a J-B Tap Grinder.

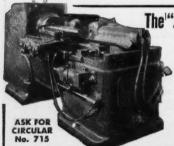
This Grinder sharpens right or left hand taps (2, 3, 4 or 5 flutes) uniformly on the chamier . . . grinds any taper or angle of chamier desired . . . can be accurately set or quickly changed for amount of relief.

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## EDWARD BLAKE CO.

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The "27" MOREY Semi-Automatic Heavy Duty LATHE

Timken bearings for the main spindle—all others entification. • Suitable for rough or finished turning shells at maximum feed. • Put your shell operations on this fast powerful lathe and turn out your work at top speed up to the limit of tool capacity. • Multiple tool holders can be supplied at front and rear; a turret mounted on separate saddle can be used instead of tailstock. • Full use of carbide tools can be taken by this heavy duty lathe.

MOREY MACHINERY CO., INC. 410 Broome Street New York, N.Y. The r

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# **CARBIDE TOOLS**

The real test of any cutting tool today is how MUCH - how FAST - how LONG it can produce between grinds. Judged by these vital standards, TECO CARBIDE TOOLS give you the "edge" for high speed turning, boring and facing on toughest ferrous and non-ferrous metals. How much? 10 to 50 times more pieces per grind. How fast? 4 to 11 times faster than high speed steel. How long? As much as 200% longer tool life. Proof? Try Teco Carbide Tools in your own plant. All grades and styles to meet practically any machining needs. Let us know your requirements.



## TECO CARBIDE TIPS FOR IMMEDIATE SHIPMENT

Complete range of standard grades, styles and sizes for brazing to your own tool shanks. Order today no waiting.

# ELECTRIC CORPORATION

562 39th Street Union City, N. J. Branch Office: 2906 Fuclid Avenue, Cleveland, Ohio Pioneers in Tungsten Carbides for Over a Quarter Century

soften and permit deformation of the electrode tip, also producing pick-up by alloying the tip with the material being welded.

Experimental production to date indicates a complete elimination of pick-up when the refrigerating unit is used, particularly on Progressive Aluminum and Stainless Steel Welders. Retention of tip shape by preventing softening is also said to be reflected in the maintenance of higher current density at the weld.

The Progressive Refrigerating Unit can also be used for welding other



# TOLEDO Variable Speed **Transmissions**

For variable speed control of V Belt driven equipment.

Low in cost . . . Easy to Install . . . Convenient Size . . . Simple to Operate . . . No Belts to Shift Speed Selection in Stepless Speed changes.

Types 1A and 2A Provide up to 3 to 1 Ratio with Power Ratings from Fractional to 4 H.P.

Other Types Available to Provide Speed Changes up to 10 to 1 Ratio. All Types Available Either In Complete Assembly or Wheel Assembly Only.

If you have a variable speed requirement it will pay you to investigate these devices. Write for literature and quotations.

THE TOLEDO TIMER CO.

#### 2224 ALBION ST. TOLEDO, OHIO



Progressive Refrigerating Unit for Aluminum and Stainless Steel Welders

types of material besides aluminum and stainless steel and may also be applied to the cooling of industrial coolants, cutting oils, and so on. The unit is available in a range of three sizes designed respectively for use with (1) a single aluminum welder, (2) two welders, and (3) a bank of four such welding machines. The unit is provided with automatic thermostatic control, all standard safety appliances, built-in de hydrator, heat exchanger, external in-dicating thermometer, high efficiency

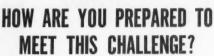


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efense Production Demands

GREATER ACCURACY CLOSER LIMITS Interchangeability With Parts Produced Elsewhere





Your present equipment, adequate under normal conditions, must be augmented by modern tools and instruments which do not depend on the operator's skill and measuring feel. The best investment you can make to guard against rejections, disputes, loss of time and materials is in inspection equipment.

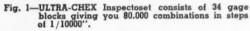


Fig. 2—The SCHERR COMPARITOL used to check plug gages, pins, bearings, aircraft parts, ammunition components to an accuracy of .0001" and .00005".

Fig. 3—The WILDER PROJECTOR for measuring or comparing screw threads, gears, templates, punchings and other objects by means of a magnified shadow image. Speeds up inspection.

Fig. 4—TOOLMAKER MICROSCOPE for precision checking of thread gages, ground taps, angles in degrees and minutes, linear dimensions, templates, cutters, hobs, forming tools. Will check the most complicated job in minutes instead of hours required by old mehods.

Write today for literature, prices and delivery dates.

We also furnish Reed Micrometers—GS Tool Chests—GS Dial Indicators—Radius Dressers—Surface Plates—Angle Irons—Snap Gages—Ultra-Chex Gage Blocks.
Ask for folders on above.

For Quick Quotation Telephone CA6-1429

GEORGE SCHERR CO., INC.
130 Lafayette St. New York, N. Y.



Fig. 2

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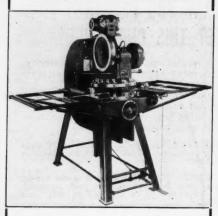


Fig. 4

# SPEED UP SHORT RUN PIERCING JOBS

Save time lost in lengthy die changes and gauge set-ups. Reduce handling operations and costs.

# **Use WIEDEMANN** TURRET PUNCHES



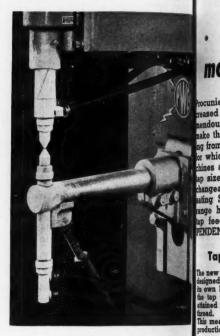
Type R-41P, motor driven, 28" throat, carrying 18 punches and dies. Capacity 12 tons. Gauging table shown will reduce or eliminate layout time.

TURRET PUNCHES ranging from hand operated types to 80 ton power units for almost all requirements. Tables to make templates and hold the dimensions within ±.002. Other tables for following and duplicating templates. You can reduce the time needed on your short run piercing operations tremendously.

# EDEMANN MACHINE

1831 SEDGLEY AVE. **PHILADELPHIA** PENNSYLVANIA

pump with variable pressure, and so Peculiarly enough, while the refrige ating unit absorbs a consideral amount of heat, experience indicate amount of fleat, that welding machine settings are a tually lower than when operating with water cooling. Being self-contained the unit can be easily installed, in more cases, by simply disconnecting the



Progressive Three Phase Aluminum Welder's which refrigerating unit has been connected.

Note frost on the welding electrodes.

water lines to the welder electrodes and coupling the refrigerator unit inlet and outlet connections to the electrode water piping.

### Kalamazoo Improved Metal-Cutting Band Saw

An improvement in the accuracy of its metal-cutting band saw to a point where additional savings in material are said to be effected has been announced by the Machine Tool Division, Kalamazoo Tank & Silo Co., 507 Harrison St.

December, 1941

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# the refriger evolutionary New consideral evolutionary New Tapping Machines

. Give you Faster more Accurate Tapping

rocunier Universal Tapping Machines give inreased output, more accurate tapping and tre-mendously increased tap life. The features that make this possible include: 1. Four Speeds, rangng from 390 to 2050 R.P.M., efficiently handle jobs or which conventional high speed tapping matimes are inadequate. 2. One machine handles ap sizes from No. 2 to 1/2" through two interchangeable heads. 3. Extra long Spiral Compenating Springs conveniently located, with wide ange hand-screw adjustments, maintain pre-set p feeding and reversing pressure INDE-PENDENT OF OPERATOR.

### Tap Establishes Its Own Lead

the new Procunier Universal Tapping Machine is so designed that it actually allows the tap to establish is own lead. There is nothing more accurate than he hap itself in thread-cutting — so maximum tapping efficiency is attained where the tap is free to establish its own lead in cutting the This means more accurate tapping with every thread uniform, greater

production with less spoiled work and less tap breakage. \$\footnote{\text{SND FOR BULLETIN}} \text{giving full details, description and prices on the full line of Procunier Universal lapping Machines, hand, foot or air-operated the complete line of Procunier Precision Tapping Heads to meet all needs and the new Tru-

Grip Tap Holder.

AFETY CHUCK COMPANY 12 S. Clinton St., Chicago, III.

PROCUNIER SAFETY CHUCK COMPANY 12 S. Clinton St., Chicago, Ill.

Send me bulletins on: High Speed Tapping Heads Tru-Grip Tap Holders Universal Tapping

City......State.....



December, 1941

MODERN MACHINE SHOP

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Kalamazoo, Mich. The improved saw has a capacity for 8-inch round stock and 8 x 16-inch flat stock. A new yoke and arm and hydraulic vise design permit wafer thin cuts the full width of the throat with variations of only a few thousandths in thickness. Thus, the saw is said to cut closer dimensions,

of heavy work. The saw can be plur into any electrical outlet; no cook required.

Other features of the improved include 100 per cent ball bearing equipment, three speeds, automatic gray feed, ball bearing blade guides, const belt tension, hydraulic frame control cushion drop, and fully enclosed wo and gear reduction drive. A new off block provides and accurate mea

ment of stock. saw occupies a space of 25 x 65 inch weighs 625 lb., and quires only a 1/4 motor for the hear All grades work. saw blades are av able.

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Designated as the Vernon No. 0, compactly designed horizontal milin

machine which is said to be ideally suited for relieving or replacing hear milling equipment has been introduce by the Machinery Mfg. Co., 1915 E. Sis St., Vernon, Los Angeles, Cal. Fatures of the machine include bronze clamping shoes with hardened stee screws and individual hand levers to ensure instant and positive locking of overarm.

Machine

The overarm bracket for supporting the arbor is constructed so that the bracket can be set next to the cutter for taking extra heavy cuts with absolute elimination of chatter. The spindle is of heat-treated and ground steel and has a No. 9 B & S taper. To permit adjustment for wear, the spindle is

thereby saving steel. A larger model with 8 x 22-inch capacity is also available.

Removable, clip-type brushes are said to lengthen the life of saw blades by sweeping the saw completely clean of metal chips at each revolution. The brushes also protect the gears from metal chips, dirt, and dust.

The Kalamazoo Improved Metal-Cutting Band Saw can be made readily portable by the use of caster mounts. Lightweight combined with sturdy design give easy one-man mobility to any spot in the plant, thus reducing set-up time and saving considerable handling

Filing Saving Stoning

## GREATER ACCURACY LONGER LIFE

Shop men who use the ILLINOIS Die Filing Machine know that it turns out work of higher accuracy years longer than ordinary bench filers. Quality construction is evidenced by such features as hardened and ground shafts operating in bronze bushings plus a pressure oiling system. Write for descriptive literature today.

ILLINOIS TOOL WORKS
2511 N. Keeler Ave. Chicage, Illinois

FILING MACHINE DIE



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# CHUCKS THAT OPEN

# al Milling THEIR MOUTHS TOO WIDE ... GET "BELL MOUTH"

Probably you have many new faces on your production line these days. It will do no harm, therefore, to restate some of the elementary principles of good chuck maintenance and practice. Chucks play such a vital role in the Defense Program that anything we or you can do to make them serve better and last larger is all to the good.

Experienced machinists know that chuck ions are not intended to be operated beyond the periphery of the chuck body. Yet it is being done and it is causing good chucks to develop "bell mouth" and other inaccuracies due to

strain That means equipment out of service and unnecessary parts or replacement calls on an already overtaxed industry.

"Bell mouth" used to be a common chuck disease years ago. Cushman developed improvements in design, better cross sections, adopted finer material to give body ribs greater strength and rigidity. You will never know "bell mouth" if you insist on your Cushman Chucks being used properly within their rated capacity.

Cushman Engineers stand ready at all times to help you make most efficient use of your work-holding equipment. Write us.



A WORLD STANDARD FOR PRECISION

December, 1941

CALL YOUR INDUSTRIBUTOR

THE CUSHMAN CHUCK CO. HARTFORD, - - CONN.

MODERN MACHINE SHOP 227

# Write for your copy



This 40-page Metal Cutting Manual contains specifications and prices of Spartan Band Saws and Hack Saw Blades; reference charts on Hand Blades, Power Blades, recommended teeth, speeds and machine sizes for Band Saws, standard gauges with decimal equivalents, weights of band saw stock; S.A.E. and color charts.

Let us help you get more in value and performance out of your Hack Saws and Band Saws. Write for your copy today—or ask your distributor for one.

Spartan HACK SAWS BAND SAWS
SPARTAN SAWS WORKS, Inc.
SPRINGFIELD MASS.

mounted in Timken tapered roller begings.

All bearing surfaces of the mach are hand scraped. Dovetails of kn column, and table are hand scraped as spotted. Dials are of an easily adjust friction-type, large and beveled a quick reading and accurately graduals to 0.001 inch. The dials are activate by handwheels.

The cross and longitudinal fee



Vernon No. 0 Horizontal Milling Machine

screws of the machine are mounted in double row ball bearings for easy, accurate operation. The machine is equipped with tapered gibs throughout which are unusually large and readily adjustable to accommodate for wear and for uniform bearing surface.

The knee of the machine is of study box-type construction with unusually long bearing surfaces on vertical ways. The elevating screw is ¾ inch in dameter, and end-thrust exerted by load of table, saddle, and knee is taken on an extremely large ball thrust bearing.

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An Esco E-22 Drill Jig for multiple-drilling six holes in tractor hub.



Esco Jack Lock applied to a specially designed tumble jig for Y-shaped casting.



Close-up of fixture layout on fully automatic drilling machine designed and built by Esce Engineering Corp.

JIGS . . FIXTURES SPECIAL MACHINERY

Our designers and tool makers are thoroughly experienced in the building of tools, jigs, fixtures and special machinery... for defense items. Individual items or complete programs.

Write or wire for a representative or for further information.

**Manufacturers of** 

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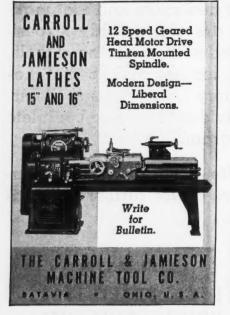
December, 1941

MODERN MACHINE SHOP 2

A fully enclosed variable drive provides correct spindle speed for every job and is instantly controlled by a handwheel conveniently located at the side of the machine and readily accessible to the operator. "B" section V-belts are used from motor to counter-shaft to ensure smooth, efficient transof maximum power. "spring loaded" motor bracket permits automatic compensation for varying center distance throughout the entire speed range.

The pedestal of the No. 0 mill is fabricated steel and serves the dual purpose of firmly supporting the machinand fully enclosing the entire dri mechanism.

Specifications of the Vernon No. Horizontal Milling Machine are as in lows: spindle—size of taper, No. 9 B S; hole through spindle, & inch; speed 100 to 1,000 r.p.m. or 150 to 1,500 r.p.m feeds—longitudinal (with hand screw 12 inches; longitudinal (with he lever), 10 inches; transverse, 51/2 inches vertical (maximum distance table top middle of spindle), 9¼ inches; table size, 5½ x 20 inches; number of T-loi size, 5/3 20 inches; number of T-101 1; width of T-slot, ½ inch; vise—wid of jaws, 4 inches; depth of jaws, 1 inches; open (with steel jaws), inches; open (without steel jaws), inches; overall height with swive) but 31/4 inches; overall height as plain vise 2 inches; net weight of vise, 19 heads of the second of the second or the second motor (horsepower and speed recor mended for maximum efficiency of ope ation), 1 h.p., 1,750 r.p.m.; dimension and weights of machine—height over 60 inches; floor space required, 29 x inches; base dimensions, 18 x 24 inches net weight (approx.), 750 lb.; shippin weight (approx.), 850 lb. A universe vertical milling attachment and long tudinal power feed are available for the contract of the cont No. 0 horizontal mill.



### Walker-Turner Foot-Operated Speed Lathe

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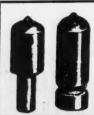
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Adaptable to handling many job now being done on conventional lather or similar machines, the foot-operate speed lathe illustrated herewith is been placed on the market by the Walker-Turner Co., Inc., 7111 Berckmi St., Plainfield, N. J. The lathe is signed for use in polishing, burring and lapping ferrous and non-ferror metals and plastics, and will child



## FOR DEFENSE KARELSEN'S DIAMONDS KEEP THE WHEELS OF INDUSTRY TRUE DIAMOND POINTED EMERY WHEEL DRESSERS

1/4 KT. TO 10 KT.

IMMEDIATE SHIPMENT Send for Prices

Specify Holde "It it's made of Diamond—Ask us First."

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FATABLISHED 1852 1 A YORK, N. Y. TEL. VAN. 6-8688

the mach entire dri ernon No. are as fo No. 9 B inch; spec 1,500 r.p.m nand screw (with ha e, 5% inches table top ches; tabler of T-sk vise-wi of jaws, 1 jaws). l jaws), swivel b s plain vi vise, 19 lb peed reco ency of ope

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N. 6-5688

mber, 1941



# Air-borne MENACE

THE parachutist arrives no more stealthily nor with more devastating results than do rust, corrosion, tarnish and a host of other air-borne enemies so harmful to your product. There may not yet be a perfect defense against the parachutist but there is a defense against the elements which endanger your products . . . a defense which thousands of manufacturers have found to be the perfect protection against "air-borne menaces" . . . Egyptian Finishes!

Many of the finishes in the extensive Egyptian line are so perfectly suited to National Defense work that they are rapidly becoming approved standards for manufacturers engaged in this undertaking. We would like to tell you more about Egyptian Finishes in relation to defense work. Just tell us what the job is and we will be glad to recommend a proper Egyptian finish for it.





rounds, tubing, and hexagonal shape up to 2 inches in diameter. According to the manufacturer, the lathe is much being used extensively in the aviation industry to polish engine parts such avalves, push rods, bolts, and like part at a great saving in time and material the Walker-Turner Speed Lather

The Walker-Turner Speed Lathe equipped with a three phase motor direct drive or can be obtained with gear-driven type motor. A foot pear



Walker-Turner Foot-Operated Speed Latte

controls the motor switch and a spechronized brake, which brings in spindle to an instant stop when mow circuit is broken. The brake holds in spindle stationary while work in the chuck is being changed.

Available with either a Jacobs chard of ½ or %-inch capacity or a 4-hot three-jaw universal lathe chuck, by Walker - Turner Foot - Operated Spel Lathe has a speed range of from \$0.00 7,200 r.p.m. The unit is also available with a two-speed motor. Overall height of the lathe is 42 inches and weights depending on motor, up to 300 pounds.

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Tomorrow's problem:

Tomorrow's problem:

Competition!

Solve BOTH with

DIAMOND
TOOLS



Shaped Diamond Tools for Turning, Boring, Facing

MESSING TOOLS • Also • WIRE MANING DIES • CORE BITS • MONO POINTS • WRITING PENCILS • VALVE REFACERS • IMPREGNATED MESSERS • DIAMOND CHARGED SAW MADES • GLAZIERS' TOOLS.

Manufacturers who now use "Asco" Diamond Tools to increase defense production, will be in a favorable position to meet keen post-war competition. The unequalled hardness, durability and cutting qualities of diamonds, so vital to today's need for faster production, will provide the savings that will keep many a manufacturer "out of the red" when business goes back on a peacetime basis.

"Asco" Diamond Tools are unsurpassed for turning, boring, milling and truing on toughest metals, alloys and abrasive materials. They permit precision cutting at higher speeds, maintaining close tolerances for much longer periods. They impart a finish so smooth that further grinding and polishing are often unnecessary. The name "Asco" is your assurance of dependable quality, backed by Anton Smit & Co., Inc., for over thirty years specialists in industrial diamonds for every need. Send blueprints for quotations on special shaped tools. Write for illustrated folder and prices.

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IMPORTERS OF INDUSTRIAL DIAMONDS—BORTZ, CARBONS AND BALLAS.
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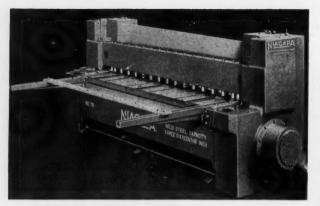
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Niagara Series No. 1 Power Squaring S

#### Niagara Series No. 7 Power Squaring Shear

Designated as the Series No. 7, a line of power squaring shears in 4 to 12foot cutting lengths and capacities from 1/4-inch to 10 gauge is announced by the Niagara Machine & Tool Works, Buffalo, N. Y. The shears are of underdrive design with drive, including flywheel, gearing, clutch, eccentrics, and connections. complete enclosed and open ing in a bath of o curacy resulting to advanced machine sign permits straigh shearing to within few thousandths an inch. Camber curl of narrow strip

is said to be eliminated.

The Series No. 7 shear has an operating speed of 60 strokes per minute combined with convenient, safe has ling of stock and off-cut material, a other features. A self-measuring, he bearing, parallel back gage adjustant to increments of 1/128 inch is avaluable as standard equipment, together with front gage with front bracken and side and bevel gages.

Stadoil Manufacturing Co.

#### CEMENTED CARBIDE TOOL FINISHES ARE GREATLY IMPROVED

With STADOIL DIAMOND LAPPING OIL - The Only Product designed specifically to lubricate diamond wheels.

INCREASED WHEEL PRODUCTION - FAR GREATER WHEEL LIFE.

PREVENTS THE LOADING AND GLAZING OF YOUR WHEELS. Wheels already loaded and glazed are quickly and easily "revived."

NO TOOL PRESSURE REQUIRED IN USING STADOIL ON YOUR WHEELS OR LAPS.

Widely used by Industrial accounts and in the Motor Rebuilding trade.

OUR INDUSTRIAL JOBBERS BELOW, if you are near them.

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Ball Bearing



Frictionless, Self-aligning

When main shafts with long bearing centers are mounted on (CJB) Self-aligning ball bearings maintenance is reduced

to nearly zero. Occasional greasing is all that is needed to keep them running year after year.

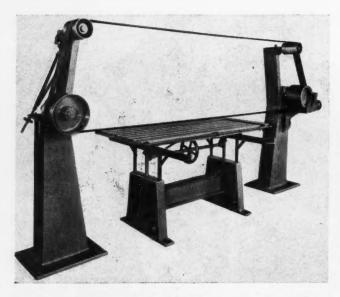
CJB) self-aligning bearings are accurate to the 'nth degree. Solid type well balanced retainers, with constantly lubricated ball pockets eliminate friction and assure longer lie. Two rows of balls, accurate in size and sphericity to .000025 inches carry loads at full contact whether shafts are deflected in service or if alignment is subject to change.

EJB self-aligning bearings are suitable for slow, medium or high speeds. Send for catalog and submit your drawings for our recommendation.

3029 West 47th Street

Chicago, III.





#### Jefferson Endless Belt Sander

Designed to eliminate hand sanding and finishing, the Jefferson Endless Belt Sander shown in the illustration has been brought out by the Jefferson Machine Tool Co., 750 W. 4th St., Cincinnati, Ohio. The sander is designed for use with wood or metal and can be used on large, flat as well as concave or convex surfaces.

The flexible sanding belt responds quickly to the operator's touch. The table travels on ball bearing rollers and is easily moved to carry the work back and forth while the operator applies pressure to the flexible belt with a block or pad. The belt travels at the proper level to enable the operator to

work in a nati position withou fatigue, and on head idlers ke the upper tra of the belt up a out of the way.

The belt star ards are indepe ent and are b of heavy struck ral steel, elect cally welded form a rigid m They are self-su porting and c be placed at a distance apart accommodate v rious lengths materials.

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heavy structural steel, electrically well ed form a rigid and substantial founds tion for the work table, which has vertical adjustment by handwheel of linches. The table stands 32 inches from the floor and is adjustable up to 4 inches. The table top is 36 inches with x 80 inches long, is built of heavy maple, and is mounted on ball bearing rollers, thereby making it easy to move traveling 36 inches backward and for ward. A conveniently located locking device enables the table to be locked in any desired position. An adjustable stop bar attached to the table is provided in hold the work in place. A metal of the full length of the table serves as a handle for moving the table.

For handling unusually long mate



#### New DUPLEX Die and Punch Filing Machine

the exclusive double-purpose tool with adjustable stroke from 0 to 11/2". This machine files dies in the conventional way on upper table (see picture at left), and punches with heels, flanges or blind holes on lower table from above (see picture at right), by tilting upper table out of way

MARBURG BROS.,

NEW YORK



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#### . . . and the Mill Supply Representative delivered them in his own car at 2:50!

It was Saturday noon - an excited helper burst into the Maintenance Chief's office, shouting:

"Hey, boss, that order of fittings! None here and the machines are down!"

Then the Chief remembered that clever young salesman from the Mill Supply Distributor's. Fifteen minutes later was insisting, "I've got to have 500 tube fittings at 3 o'clock today."

And he did get them - the salesman knew where they could be had, and he delivered them in his own car 10 minutes before the deadline!

The men at your Mill Supply Distributor's are a loyal persevering lot. They are on the job everywhere, all the time. Long ago we organized the distribution of "Cleveland" Tools among the country's leading Mill Supply Distributors exclusively.

We favor adequate Preparedness for National Defense.





CLEVELAND" DISTRIBUTORS EVERYWHERE ARE READY TO SERVE YOU

rials, an auxiliary work table can be

placed on the regular table.

The main sand belt pulleys are 12-inch diameter x 8%-inch face, and the two overhead idler pulleys are 6-inch diameter x 8%-inch face. Designed to accommodate belts up to 8 inches wide, the pulleys are accurately machined all over, dynamically and statically balanced to eliminate vibration at high speeds, and run on high grade dust-proof ball bearings. By means of a conveniently located handwheel adjusting screw, the sanding belt can be kept in true alignment at all times. To reg-

DIA-TOOL, INC., YONKERS, N. Y.

Diamonds set in sintered carbide

ulate tension of belt, one idler puller has an adjustable counterbalancing spring mechanism.

The dust collector outlet of the Jeferson Endless Belt Sander is of curron, with one side hinged or convenently replacing endless belt.

The sander is furnished with diredrive from a 2 h.p., fully enclosed, dusproof, ball bearing motor designed for operation on 220 or 440 volt, the phase, 60 cycle alternating current. For wood finishing, the belt travels at approximately 5,000 surface feet per minute (No. 206 sander). For metal finishing, the belt travels at approximate 1,800 surface feet per minute (No. 300 surface feet per mi

#### Gisholt Rapid Slide Tool

Illustrated herewith is a rapid slid tool for turret lathes which has been

announced by the Gisholt Machine Co., 1219 E. Washington Ave., Madison, Wis. tool is designed to hold small boring bars and forged Movecutters. ment of the lever on the top of the unit transmits a rapid, smooth motion to the slide, thus permitting back-spacing and recessing operations to be quickly performed. Adjustable stops are provided for quick



Gisholt Rapid Slide Tool

setting in performing duplicate work operations.

#### for quick set-ups on ANY punch press . .



DICKERMAN Die Feeds handle coiled stock of any practical thickness. Maximum stock width, 4". Adjustable from 0 to maximum feed length of 3" in increments of .001". Simple to operate — accurate — economical.

WRITE FOR FOLDER No. 82

H. E. DICKERMAN MFG. CO. 321 Albany St. Springfield, Mass. for Ac

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ATLAN 149 BRO Tel. WOR

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MACHINES like these were rebuilt for various arsenals of Great Britain, Canada, India, Union of South Africa as well as for leading domestic plants.

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"The job of putting all available machines to work" means YOUR machines too - machines now in your shop — that are not up to the right degree of accuacy in production.

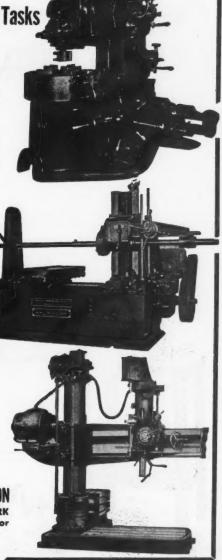
We can rebuild your machines to meet your increased production demands and recondition them to the right degree of accuracy demanded by the tasks ahead. Arrangements can be made for rebuilding one or two machines at a time. You will get

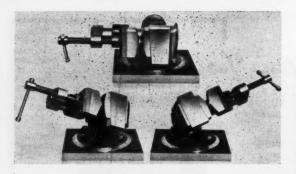
them back with a minimum of delay . . . UNCONDITIONALLY GUARANTEED.

If we can be of help, write us regarding your problem.

149 BROADWAY

fel. Worth 2-0662 Cable Address: Atmacor





#### F. & H. Universal Vise

The F. & H. Mfg. Co., 6024 Ellery St., Detroit, Mich., is introducing a fully universal vise for use with surface grinders, drill presses, and in light mill work. The vise is readily adjustable to a horizontal, vertical, and any intermediate plane, with calibrated degree shown for each adjustment. A full 360-deg. swivel is provided in a horizontal plane with a 90-deg. swivel through the horizontal axis. horizontal axis, from the horizontal to a vertical plane, and an additional 180deg. swivel transverse the horizontal axis.

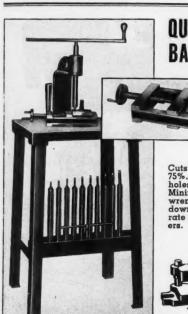
The F. & H. Universelvise is equipped with usual parallel jaws together with a Equi-Hold jaw, as shown in the illutration, which is used in clamping combination gular workpieces. The vi is said to be ideally admed ed for forming tools, the breakers, and angular work.

The company is also introducing the



F. & H. Lathe Center

lathe center shown herewith. The center is of the standard lathe type with axial oil groove.



QUICK, ACCURATE HAND TAPPING BAY STATE Hand Tapper and Vise

> An indispensable machine for your tool and die room to speed up wari and improve quality - whether you tap 2 holes a day or 200.

#### FEATURES

Cuts direct hand-tapping labor costs on dies and fixture 75%. • Requires no setting-up. Always ready. • Assume holes tapped at right angles without the aid of a square Minimizes tap breakage. • Works more simply than two wrench. • Does away with tap extensions. Spindle reached down between projections. • Bay State Vise—most contact hardened vise made—for Jig Borers and Surface Griders. Many new features of design. • Write for folds:



Manufacturers and Distributors of Producto Die Setz, Die Makers Accessories, Dickerman Automatic Press Feeds.

December, 1941

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stors of ers' Ac-ic Press

r, 1941

Engineering advances responsible for the performance of Niagara Presses include strong, rigid frame, instant acting sleeve clutch with built-in single stroke mechanism, slide with breech block die clamp, multiple "V" gibs, backgearing mounted on antifriction bearings, one-man inclining

Results include more working strokes per hour, long die life, utmost safety, reliable performance with minimum down time, and low maintenance cost. Write for Bulletin 58 covering complete range of sizes. Niagara Machine & Tool Works, Buffalo, N. Y.; Branches: Cleveland, Detroit, New York.

YOUR PRODUCTS

#### IDENTIFIED

IF PERMANENTLY

#### MARKED

IN THIS MACHINE



MARKING
BY ROLLING
IS FAST AND
ECONOMICAL
PRESERVES
DIE LIFE AND
PIECE PARTS.
REQUIRES
ONLY FRACTION OF
APPLIED
PRESSURE
AS COMPARED TO
STAMPING.

QUICK SET-UPS

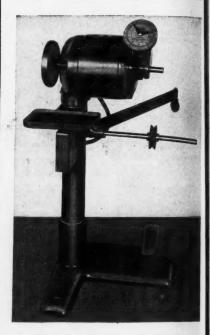
# MODEL 25 HI-DUTY MARKING MACHINE

This machine operates from your plant air line, and is one of numerous models built to produce fast, neat marking on metal parts, RI-Duty marking machines may be had for practically any marking operation, and we will be glad to make recommendations upon receipt of your inquiries. Send prints or samples of parts to be marked, showing lettering and location, also state required production.

GEO. T. SCHMIDT, Inc. 1806 BELLE PLAINE AVE. CHICAGO, ILLINOIS

#### Globe No. 2 Universal Coil Winder

Designated as the No. 2, a universal coil winder with high speed, 10,000-tun counter is announced by The Globe Took & Engineering Co., 425 Davis Ave., Dipton, Ohio. The high speed counter pemits the winding machine to operate at the maximum speed at which wire cut the maximum speed at which wire cut be fed onto the winding fixture. By using a simple fiber guide block, the



Globe No. 2 Universal Coil Winder

operator can accurately level the wirt on the winding spindle at speeds up to 4,000 revolutions per minute.

If the operator wishes to remove turns, as in the case of an overrun, the counter subtracts. After a coil is wound, the counter can be easily and quickly reset to zero preparatory to winding the next coil.

winding the next coil.

Under the above mentioned speed, the operator has full control of the Globe No. 2 Universal Coll Winder through a foot pedal. From the smooth, sensitive operation of this pedal, the control of a quick-acting brake, mercury starting and stopping switch, and motor speed

MODERN MACHINE SHOP

December, 1941

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# TUNGSTEN CARBIDE TIPPED TOOLS Price \$1.00 Each In Any Size

NEW LOW PRICES — INCREASE PRODUCTION — CUT OPERATING COSTS

Tools are tipped with Tungsten Carbide, and are suitable for machining cast-iron, brass, bronze, aluminum, non-ferrous materials (such as hard rubber, bakelite, fibre), and tough alloy steels up to 500 Brinell hardness.



#### Left-100 Series

Left Hand-Reverse Image, Right Hand Shown

Tool No. RH	LH	Shank Size		
R-100	L-100	1/4 x 1/4 x 2		
R-101	L-102	fo x fo x 21/4		
R-103	L-104	% x % x 21/2		
R-105	L-106	78 X 78 X 3		
R-107	L-108	1/2 x 1/2 x 31/2		



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universal 10,000-tum Globe Tool

Ave., Day. unter per

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#### Below— 300 Series

Tool No.		Shank Size			
300	1/4	x	1/4	x	2
301	16	x	18	x	21/2
302	3/8	x	3/3	x	21/2
303	1/2	x	1/2	x	31/2

#### STANDARD TUNGSTEN CARBIDE TIPPED TOOL BITS

In lots of 12 assorted in any Series; 100-200-300 Series an extra 10% will be allowed; also in lot of 50 assorted 20% discount will be allowed.



Sizes not listed as well as special TIPPED TOOLS will be quoted upon request. When ordering, state tool number and quantity desired.

We Carry Silicon Carbide Emery Wheels for Grinding Tungsten Carbide Tool Bits.

SEND FOR OUR NEW 1941 GENERAL CATALOS

#### VICTOR MACHINERY EXCHANGE, INC.

251 CENTER STREET

NEW YORK, N. Y.

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speed 1941 control are all synchronized for rapid but smooth acceleration and immediate deceleration, thereby making high coil

production possible.

The model for winding from No. 25 to No. 40 copper wire or equivalent has a speed range from 0 to 6,000 r.p.m., while back-geared models are provided at ratios for higher torque as required in winding larger wire. These models have speed ranges which are proportionally reduced. Special combination back-gear and direct-drive models are also available. An automatic-stop feature for stopping on a predetermined number of turns can be obtained on all models by means of an electrical interrupter operating in connection with a special turn counter.

#### Mead "Air Clamp"

A newly designed hold-down for drill press work to be known as the Mead "Air Clamp" has been placed on the market by the Mead Specialties Co., 15 S. Marker St., Dept. 10A, Chicago, Ill. The unit is designed for use on any drill press having a cylindrical column, and is quickly attached by means of a divided collar which can be clamped in



Mead Air Clamp Applied for Holding Work While Drilling

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any desired position.

The working head is mounted on a heavy horizontal arm which slides in a split boss on the column collar. Two hand levers hold the head in any desired position so that pressure may be applied in any direction and at any point on the work, regardless of size and shape,



## NICHOLSON EXPANDING MANDRELS

(Sliding jaw and tapered slot type)

For holding work while being machined between centers on lathes, grinders, millers, shapers, etc.



Both types sold singly or in sets. Made of tool steel, hardened and accurately ground. Economy tools. Prompt delivery at this time.

#### TYPE A-STEP JAW DESIGN

Size No.	Range of Bares Taken	Net Price
1A	1/4" to 1"	\$12.00
2A	1" to 11/2"	16.00
3A	1 1/2" to 2"	23.00
4A	2" to 3"	34.00
5A	3" to 4"	40.00



Also make larger sizes taking up to 7".
Write for Bulletin.

#### W. H. NICHOLSON & CO.

136 OREGON ST.

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WILKES-BARRE, PA.

#### TYPE B-STRAIGHT JAW DESIGN

Size No.	Range of Bores Taken	Not Price
1X	1/2" to 18"	\$10.00
2X	" to 21/32"	11.00
3X	21/32" to 3/4"	12.00
3X 00	3/4" to 1/4"	14.00
0	1/4" to 1"	16.00
1	1" to 11/4"	18.00
2	11/4" to 1 18"	21.00
3	1 %" to 2"	29.00
4	2" to 21/2"	40.00

Above prices subject to change

#### USE INDUSTRIAL BAGS

# to PREVENT LOST PARTS!

There's no time these days for hunting lost parts—either in your plant or your customers'. Save packing time, labor and cost by tying parts to product, and assure safe, prompt delivery of every part.

Time studies show savings up to 90% in this use of industrial bags. Use them also to tie parts

to products, to ship and mail small parts economically, and to mail samples right with letters. Order suppliers to use them in shipping to you. A postcard will bring you free samples and full information.

Send for Free Samples



"Efficient as a Zipper!"



245

within the capacity of the drill press.

The Mead Air Clamp is operated by means of a two-way valve on the upper left side of the working head. For certain types of operations in which drilling time is short and new work is fed into the fixture rapidly, a foot control is available.

Quickly detachable hold-down feet of various designs can be used according to the shape of the work, or the ram alone may often be used on large units. When the pressure is released by means of either the hand or foot control, the ram automatically returns to the top position, thus providing ample clear ance for removal of the work.

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The model shown is designed for use with a line pressure of 40 to 80 lb. as is suitable for drill presses up to 1/2, inch capacity. Collars to fit drill prescolumns of various diameters can be furnished. The unit has a "reach" about 14 inches from the drill prescolumn so that the pressure-foot may be brought down behind, on either side of or practically in front of the drill preschuck. The ram is rotatable in the cylinder so that the pressure-foot may be swung a full 360 deg., thus providing an almost unlimited variety of positions.

An outstanding feature of the Meal Air Clamp is the instant ease with which it can be set for various opentions. By means of the unit, drlll jig can be reduced to the simplest form and built-in clamps and hold-down eliminated. In addition, the Mead Air Clamp is said to increase production and reduce operator fatigue. Due to the constant flexible pressure of the unit, variations in thickness of the work (frequently a source of trouble with castings) are said to cause no difficulty or delay in clamping.

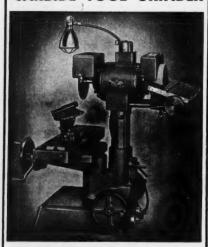
Marquette 160 Series A.C. Arc Welder

A series of a.c. arc welders designated as 160 is announced by the Marquette Mfg. Co., Inc., Minneapola Minn. The series includes four models namely, the Models 160, 161, 162 and 162T, all of which employ Class B, all asbestos insulation, high grade sillow transformer steel, and aluminum angle frame work (to lessen eddy current losses) in their construction.

Each welder is supplied complete with a welder's helmet with adjustable had band, 15-foot extra flexible welding cable and holder, 15-foot flexible ground cable and ground clamp, 8-foot threwire power cable (third wire far



#### CARBIDE TOOL GRINDER



This New Carbide Tool Grinder has a wider, longer table of much greater longitudinal movement. It is designed for complete maintenance of cemented carbide tipped tools; for many manufacturing processes, too.

(Pin this to your letterhead and send it to us; we'll do the rest!)

Please send us your new bulletin CTG41-12M with full details and prices on your Carbide Tool Grinder.

K. O. LEE COMPANY Aberdeen, South Dakota

#### FOR REAL PROTECTION AT VITAL FASTENINGS



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IN every Elastic Stop Nut, a resilient nonmetallic collar eliminates thread play automatically . . . and holds thread faces of nut and bolt in a constant pressure-

contact. Cannot be loosened by vibration or hard service.

CATALOG contains a graphic explanation of the Elastic Stop principle, presents test and application data, and lists the complete line of nuts. . Write for a copy.



ELASTIC STOP NUT CORPORATION 1127 VAUXHALL ROAD . UNION, NEW JERSEY



Yesterday, Known for SERVICE TODAY . . . Vital to DEFENSE

# CLEMENTS

PORTABLE-ELECTRIC COMBINATION **BLOWERS & SUCTION CLEANERS** 



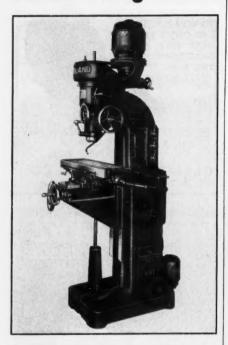
WRITE FOR CIRCULAR OR SEE YOUR MILL SUPPLY SALESMAN ASK FOR 10 DAYS FREE TRIAL

CLEMENTS 6655 S. Narragansett Ave. Chicago, III.



247

#### The Cleveland No. 1 **Vertical Milling Machine**



A rigid, high-speed machine for Tool Rooms, Die and Mold Shops and Production Plants.

12 speeds (4 high and 8 lower) from 100 to 1750 r.p.m.

12 automatic longitudinal feeds from .6" to 121/2" per minute.

Write for folder which gives complete specifications.

The Sommer & Adams Co. 18511 Euclid Ave. Cleveland, Ohio grounding), power plug and wall receptacle, and assortment of welding electrodes, and is designed for operation a 220 volts, 50-60 cycles. Welders for operation on 440, 550, other special voltage.

ages can also be supplied.

The Model 160 welder has a range of from 20 to 125 amperes and is especially adaptable for shops that do light service work, such as sheet metal, but and fender shops, and garages. The unit handles to 1/8-inch electrodes in clusive.

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The Model 161, which handles it is of from 20 to 175 amperes and is ideally suited for light to medium maintenance work in job welding shops, industrial and manufacturing plants, and for repair work in body shops and garages.

The Model 162, which is shown in the



Marquette Model 162 A.C. Arc Welder

illustration herewith, has a range of from 20 to 250 amperes, handles he 1/4-inch electrodes inclusive, and is designed for job welders and contractor confronted with heavy work. According to the manufacturer, it is used of feetively on farm machinery in refiner. fectively on farm machinery, in refineries, and for production and maintenance work, as well as in garages and

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—at the machine
—at the bench

Sizes:
¼" to 7"
dia. and
larger

COMTORPLUG

For gaging bores to

fractions of .0001"

This unique gage — self-aligning and self-centering—AUTOMATICALLY assures accuracy in gaging to fractions of a tenth. Shows size, front or back taper, out-of-round, barrel shape, etc. Assures minimum-rejection teamwork between operators and inspectors!

Request Bulletin 27

THE COMTOR CO.

64 Rumford Ave.

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#### AUXILIARY STOCKROOMS

- Wherever You Need Them!

STACKBIN sections will give you a Stockroom wherever you want it—quickly and easily as building a sectional bookcase. These patented sectional storage bins nest together without the use of tools—cost you nothing to build, nothing to move. Find out today how STACKBINS can lower YOUR handling costs.

Write to
STACKBIN CORPORATION,
S3 Troy St., Providence, R. I.

STACKBINS
"STACKED AND STILL ACCESSIBLE"



Northern 5-Ton Electric Hoist Crane

body shops for a large variety of work.

The Model 162T welder is identical to
the 162\*except that it is mounted on a
specially designed heavy duty fourwheel truck and a crane eye is attached to the top for easy portability. Each wheel is equipped with anti-friction bearings.

#### Northern Electric Hoist Crane

Northern Engineering Works, Detroit, Mich., is now offering a line of electric hoist cranes for auxiliary use in large plants, main hoisting in small plant The cranes are easy to handle and are built in various capacities up to those large enough to move 15-ton loads. The many different types available include top running or underhung cranes, hand or motor travelled bridge and hold cranes, transfer type cranes, and special double hook type cranes. Cab control is furnished where desired Jib crans and self-supporting pillar cranes an important auxiliary types. All of the cranes are furnished with a Northern Hi-Lift Hoist, a modem

low headroom hoist built with machine

#### FLEXIBLE SHAFTS MACHINES

1/8 H.P. TO 3 H.P.



STRAND &

5001 No. Wolcott Ave.,

Chicago



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#### **High Quality Machine**

PAY MORE-GET MORE AND DO MORE

> Buy **`STRAND"**

HIGH QUALITY Flexible Shaft Machines GROUND CUTTERS High Speed Steel ROTARY FILES

> Hand Cut High Speed Steel SEND FOR CATALOG. 36th YEAR.

> > December, 1941

#### "Trumore" Diamonds ARE MOST ECONOMICAL FOR TRUING GRINDING WHEELS

Sectional View of Long Natural Diamond



Never Wears Dull ---Requires No Resetting

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Furnished In Any Type of Mounting Desired



Norton Hex.

Diamond Is Held Securely In a Special Nickel Alloy

Send for Circular and Price List

WE FURNISH FULL LINE OF SPECIAL DIAMOND TOOLS FOR SHAPING THREAD GRINDING WHEELS ON EXCELLO and JONES & LAMSON MACHINES.

F. F. GILMORE & CO. 112 DARTMOUTH ST. BOSTON Diamond Importers **Diamond Toolmakers** 

# Because only one adjustment is necessary, inexperi-

enced operators can be trusted with critical inspection operations. Object is simply placed on work rest member of stage and magnified, with the Acton Optical System, 10, 20, 30, 45, 60, 80 or 100 times.

Coordinate stage unit can also be furnished for side and forward travel and rapid visual detection to .001". Clear or ground glass screen, 11" x 14".

Write for complete details.



OUNT VERNON

NEW YORK



December, 1941

MODERN MACHINE SHOP

# Longer life for CARBIDE TIPPED TOOLS



with this wet or dry STANDARD GRINDER

This substantial precision grinder provides great economy by removing less metal from carbide tipped tools and gives keener edges in less time.

While each wheel is equipped with wet grinding attachment, a separate toggle switch operates motor driven pump permitting dry grinding. Drum reversing switch included. Manufactured in three sizes: 1 HP for 10" wheels; 2 HP 12", both with 1750 RPM motor; 3 HP 14" with 1150 RPM motor. These grinders use either cup or steel back cylindrical wheels.

Write for Catalog 43.

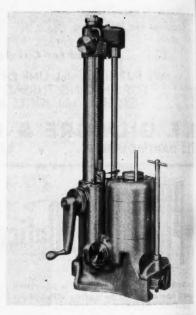
The STANDARD ELECTRICAL TOOL CO.

BURNS and 8TH ST.

tool precision. Outstanding in design and construction, this hoist is said to give maximum hoist lift, ensure continuous operation, and provide positive control and safe handling.

#### Van Norman "Per-Fect-O" Boring Bar

The Van Norman Machine Tool Co. Springfield, Mass., is now offering to the metalworking industry the "Per Fect-O" Boring Bar shown herewith to



Van Norman "Per-Fect-O" Boring Bar

use in boring all grades of cast iron brass, bronze, and aluminum. Available in six models, the unit is easy to set up and operate and is readily portable, thereby enabling it to be easily taken to the work or mounted on fixtures for continuous production. Automatic shut-off relieves the operator for other work while the bar is in operation.

An outstanding feature of the Van Norman Per-Fect-O Boring Bar is the solid support afforded the single figure to the support afforded the single figure on revolving, expansible and contractible supports that center the bar, the

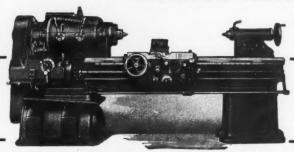
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# ROYE & EMMES ENGINE LATHES



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DEADLINES BOTTLENECKS

If the Defense Program has heaped on you more than your share of production and maintenance problems, the New Marquette A.C. Arc Welder offers "an easy way out."

Low initial cost and low cost operation enables the MARQUETTE to literally pay for itself by fast, economical welding in production as well as in the rapid

Very often important shop schedules can be maintained by the inexpensive and speedy repair of breakdowns and worn parts, without the costly and time consuming job of dismantling vital machinery.

Write today for descriptive literature.



BUY THE BEST...BUY MARQUETTE ARE APPROVED BY UNDERWRUTERS LEASONATORILL MANUFACTURING CO., INC.

December, 1941

provide a steady rest all the way down, thus preventing chatter, vibration, weaving, and taper and assuring an accurate cut the first time.

The six Per-Fect-O sizes cover a

The six Per-Fect-O sizes cover a range of diameters from 1.900 to 9.050 inches and depths from 10 to 30 inches. Shown in the illustration is the heavy duty Model No. 777 boring bar which has a capacity for boring holes from 2.6 to 5.343 inches in diameter and up to 14 inches deep.

#### "Strikeasy" Arc Welder

Known as the "Strikeasy," a 150-ampere d.c. arc welder has been an-nounced by the General Electric Co., Schenectady, N. Y., for use in fabricat-ing bright surfaced, thin gauge metals such as aircraft tubing (S.A.E.-4130) which has a wall thickness of 35 mils. The design and characteristics of the welder are said to enable operators to produce strong, uniform joints quickly and easily without spoilage.

The outstanding feature of the Strik-easy Arc Welder is its "pep" or extra high instantaneous recovery of voltage (40 to 60 volts), which helps the opera-



"Strikeasy" Single-Operator Portable Note: Generator Arc Welder for Aircraft Industry

tor to strike an arc with ease under the difficulties presented by thin metals having a bright, polished surface. Rapid accurate adjustment of the welding current is also provided by means of a to switch and a rheostat; the former for speed in obtaining wide range adjustments, and the latter for accuracy in obtaining the exact number of ampere





Electric Model 5-D1-MF (left) is ceaseless ly on the job, giving accurate count in economical, efficient production com It's ideal for counting small pieces, parts that must not be marred, articles too lightia weight for mechanical contact. Especially adapted for use with Photo-electric Relays.

> Full details in Catalog 16. Send for your copy today!

There's a Productimeter for every industrial need. Write us for assistance on you counting problems.

DURANT MFG. COMPAN

Milwaukee, Wis.

173 Eddy Street Providence. LL

December, 194

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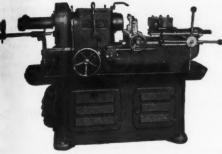
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MODERN MACHINE SHOP

# MOREY No. 2G and No. 3 TURRET LATHES

# Infinite Spindle Speeds No. 26 Speeds from: 90 to 1800 R.P.M.



Speeds from: 90 to 1800 R.P.M. or 180 to 3600 R.P.M. Capacity: 1" x 6\\(^1\)" turning length ASK FOR BULLETIN No. 629

Speeds from: 60 to 2100 R.P.M.
or 100 to 3600 R.P.M.
Capacity: 1½" x 9" turning length
Made in Plain and Universal Types
ASK FOR BULLETIN No. 727

Timken bearings for the main spindle—all others anti-friction.

Any spindle speed you want—a direct reading dial shows when you've got it.

Permits the use of carbide tools for fast cutting.

Turnet clamps and unclamps automatically.

Equally effective on second operation and chucking work.

MOREY MACHINERY CO., Inc., 410 Broome St., New York, N.Y.

# Cut Costs—Increase Production Detroit Power Screwdrivers

THESE MAGAZINE FEED POWER SCREWDRIVERS BRIVE SCREWS FASTER THAN EVER BEFORE

Machine screws, wood screws, brass screws, duminum screws, self-tapping screws, drive screws, cap screws, special screws, washer assembled screws.

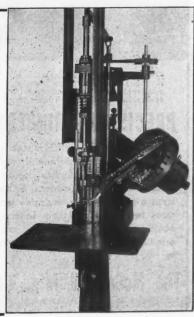
Standard heads, special heads, Phillips heads, slotless heads.

which provide handling a wide range of sarew sizes. From a No. 2-56 screw to a %" cap screw.

UNIFORM TENSION—NO MARKING OF HEADS
No stripping of threads
Driving Time: 1 to 2 seconds per screw.

Send Samples for Production Estimates

DETROIT POWER SCREWDRIVER CO.



December, 1941

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MODERN MACHINE SHOP

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needed for best results. The wide welding range permits the use of shieldedarc electrodes as large as 18 inch in diameter and as small as & inch in diameter.

As a further aid to the operator in producing welds of uniform strength, the Strikeasy Arc Welder may be used with a remote control device for reducing the current when the operator wants to fill a weld crater or when a reduction of heat is needed to avoid burn-through.

Equipment is horizontally mounted to assure efficient lubrication and to avoid excessive end thrust on its self-seals ball bearings. Cool operation is obtained by means of a fan cooling system, while isothermic relays guard against open tion on harmful overloads.

Compact and easy to handle, the Strikeasy Arc Welder is available with or without running gear. Without run ning gear, the overall dimensions and length, 28 inches, width, 13½ inches and height, 21 inches; net weight, 35 lbs. With running gear, overall dimessions are: length, 40 inches, width, i inches, and height, 27 inches; weight 415 lbs. net.



Themac Tool Post Grinder grinding slitting knives "in place." Setting grinder in this way instead of tearing down rollers saves one full day's time.

#### PRECISION

These high speed, portable, electric grinders with circumferentially adjustable grinding spindles are the most practical and modern equipment available. Their exclusive features readily adapt them to shop equipment. They can perform any grinding job on any size lathe. Write for complete catalog.

135 Mozart St.

#### Nemco Flexible Piano Wire Com Coupling

The National Electric Manufacturers Co., 60 E. 42nd St., New York, N. I. has placed on the market the Nemo

Cylindric matically bandy n ALSO T

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Nemco Flexible Coupling

Flexible Coupling shown in the accompanying illustration. The coupling is unusually simple in design, consisting of a four-layer high carbon Swedish plane wire flexible core which is fused by high pressure into metal butt ends with various size bores. The axial misalignment, nonparallelism, and angularity of the coupling is governed by the length of core between the butt ends.

The Nemco Flexible Coupling is made in sizes for handling loads from ¼ to 2 h.p. at speeds up to 6,5000 revolutions per minute.



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Within One Minute! TO HORIZONTAL

#### A Machine of Many Uses

Combines a Centerless Feed Polishing Machine, Vertical or Horizontal Belt Grinder and Surfacer or Polisher.

Cylindrical work, ¼ to 1" dia., is fed automatically-no centering, no chucking. A handy machine!

OTHER TYPES AND SIZES.

ALSO TOOL AND CUTTER GRINDERS-SENSITIVE DRILLS.

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SHARPENING COSTS No. 57T

Automatically Sharpens Metal Saws in gangs up to 8" in diameter.

Takes gangs up to 31/2" thick. The saws are automatically indexed and sharpened within variation of plus or minus .001 of exact diameter of entire lot.

Write for Folder 571.



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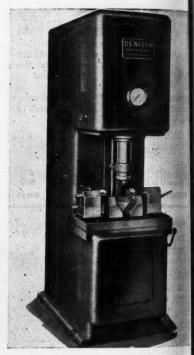
Janette Manufacturing Company 556-558 West Monroe Street Chicago, Ill. U.S.A



#### Denison Model DLAC2 15-Tog C-Type Hydroilic Press

Hav

The illustration shows the Denis Model DLAC2 15-Ton C-Type Hydro Press for straightening steel shi which has been brought out by Denison Engineering Co., 103 W. Chant St., Columbus, Ohio. By means the special tooling of the press, implarities of a few thousandths of an in



Denison Model DLAC2 15-Ton C-Type Hydroilic Press

in short, hardened steel shafts can be corrected.

Operation of the Model DLAC2 pres in straightening shafts is as follow: With the ram of the press raised, is shaft is fixed between centers. Gaga. calibrated in thousandths of an inchare moved along the shaft until they included a point where straightening inceded. Then the ram of the press, operated by a control lever, is advanced to the shaft and the centers together with the shaft are lowered to its straightening block. Additional more

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Engineering Company Frankenmuth, Mich.

Having difficulty holding tolerances?

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Demand the ZIEGLER

Floatina Holder TAPS and REAMERS

- · AUTOMATICALLY compensates for machine spindle misalignment, eliminating over-sized or bell-mouthed holes.
- Helps produce unbelievable accuracy on both new and old equipment.
- Furnished with male or female taper, straight, threaded or special shanks to fit any machine used for tapping or reaming.

W. M. ZIEGLER TOOL CO.

1926 Twelith Street

Detroit, Michigan



Have all their working parts compactly enclosed to protect your workmen against serious injury.

Have a system of Ring-Oiling Lubrication which eliminates loss of production through ground-out sleeve bearings.

Have a simple, anti-friction system of roller leverage that imposes extreme pressures upon dual friction plates and gives these clutches their

POWERFUL PERSISTENT PULL



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INGINEERING CO., 120 N. THIRD

Need **MORE Mac-its?** ... here's a way

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You can get more Mac-its-through increased production-by specifying standard sizes wherever possible.

Fewer sizes mean fewer machine changes and longer running time. So get your orders placed now for future delivery by calling your distributor today.

THE STRONG CARLISLE & HAMMOND CO., Cleveland, Ohio

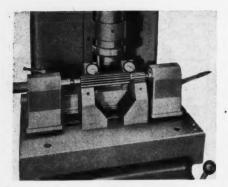


Illustration showing special tooling employed by Denison Model DLAC2 Hydroilic Press in straightening steel shafts

ment of the control lever applies the tonnage required to straighten the shaft.

The gages measure the shaft after tonnage has been applied and before the shaft is released. They are said to work swiftly and with unerring accuracy. Feather-light pressure on the press operating lever controls the movement of the ram, and the tonnage applied is in

direct proportion to the movement a

The Denison Model DLAC Hydrain Press can also be adapted to various pressing operations other than the or described above.

#### American Micron Spur Gear Hobbing Machine

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December

An American built small gear hobing machine of a type similar to the Swiss "Mikron No. 79" is now being marketed by the Triplex Machine To Co., 125 Barclay St., New York, N. Y. Known as the American Micron Spur Gear Hobbing Machine, the unit has a capacity for spur gears and pinions up to 2 inches in diameter and diametral pitch 20. The maximum length of cutting is 1.60 inches.

The American Micron Hobbing Machine is designed to cut accurately brass and steel wheels and pinions such as used in clocks, gas, water, electricity and other meters as well as in gages and many other precision instruments. The high accuracy required for this class of work results in part from the application of the hobbing method

#### "More Than Satisfactory"

90% of All Cutting-off Troubles Eliminated by Luers Blades and Holders

When a nationally known manufacturer of aviation instruments says "Luers cutting-off blades and holders are more than satisfactory, meet our requirements in every way and are better than any we ever used," it's time for you to investigate.

Excessive friction causes most cutting-off troubles. Luers blades are tapered, providing adequate, frictionless back clearance. They are tapered, thus reducing side friction. They cut a curved chip that expands without blocking the cut.

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#### QUICK-CHANGE CINCINNAT LATHES GEARED-HEAD MOTOR-DRIVEN

#### Guaranteed for Workmanship, Materials and Performance

hev need no introduction to experienced machine shop men. Their many exclusive features enable the operator to reduce operating expenses and more than earn their cost in a short time. Our close co-operation with many of the leading plants everywhere has helped solve perplexing othe problems for boring, turning or chasing any metal work always most economically.

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Latest catalog contains detailed specifications on 14", 16", 18", 20", 22", 24", 27" and 30" sizes. With them are obtainable 32 to 96 changes of thread and feed; 12 to 24 spindle speeds to cover every shop requirement. Better to get trouble free operation with unfailing precision.

Designed and produced by specialists with many years experience.

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konomical Live Ball and Roller Bearing lenters are going to play an important part in our defense program.

SCREW MACHINES, **GRINDERS** and



- l. Simplicity, sturdiness, and heavy duty.
- 25% more radial load carrying capacity than the average live center.
- Large spindle, small head, short overhang most desirable for rigidity and to be free from chatter.
- With aid of cap screw you can lock spin-dle to redress point right in your machine.
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A folder giving prices and complete details will be mailed to you upon request. hien-day trial. If not perfectly satisfied, your money will be cheerfully refunded.

OR TOOL MFG. CO 12282 TURNER AVE. DETROIT, MICHIGAN

December, 1941

MODERN MACHINE SHOP 261

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of generating the tooth profile.

The gear blanks are firmly held on a work arbor, one end of which fits into a tapered hole in the work spindle nose. Pinions are held in a spring collet chuck which fits completely into the work spindle taper. A tailstock is provided for the support of the outer end of the workpiece or work arbor.

The hob spindle is mounted on a vertical slide having micrometer hand feed for positioning the hob to proper depth of cut. The entire assembly has a horizontal power screw feed with automatic stop. The revolution of the hob



American Micron Spur Gear Hobbing Machine

spindle, through index change gears is the rear of the machine and a wom wheel on the work spindle, is transmitted to the work spindle in a min proper for the number of teeth to be generated.

A set of index change gears for one chosen number of teeth between 6 and 390 is furnished with each machine Additional change gears for any other number of teeth can be furnished and are easy to mount on the machine.

If the tooth shape is of the involute type, one hob is said to cut all gears of an identical diametral pitch regardless of the number of teeth. For cycloidal teeth, however, an individual hob is required for each particular number of teeth.

The rotation of the work spindle through a pair of helical gears, change gears on the front of the machine, and a worm drive, is transmitted to the longitudinal feed screw in a ratio ap-



stock at our local service and stock branch. Loc-Key-Set construction now used in all D.T.Co. Diamond Dressing Tools. Call or write for details.



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internal key construction, per-mitting micrometer control of

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#### Quick-Acting PRESTO - VISE

Sliding jaw is moved up to work with lever in raised position. Lever is then pressed downward to exert desired pressure on part being clamped. To release, lever is raised which disengages clutch and slide moves away from Write for complete details.

D. A. SMITH & CO. DETROIT, MICH. **8085 LIVERNOIS** 

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# YOU USE TAPS YOU NEED WALTON TAP EXTRACTORS The price of a new tap is nothing, compared to the cost of removing the broken one by any other method. WALTON BACKS it out; saves the thread (and your time). Stock sizes #4 to 1½" in 2, 3 and 4 -flute styles. Sent on 30 day free trial. Booklet 132 gives details and prices. Write for it today.

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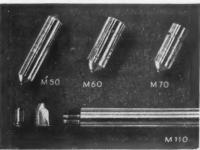
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More output and better work will result if wheels are kept sharp and true with MEYERS DIA-BRASIVE DIAMOND DRESSING TOOLS. All types, all sizes. Standard and special. Ask for literature.

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98 ALLYN STREET HARTFORD . CO

BORING, FACING and INTERNAL THREADING TOOLS

for holes from 1/8" upward, 15 different sizes

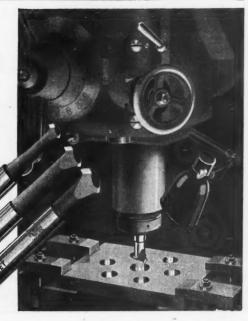
Made of Super-High-Speed Steel Specially Heat Treated

Indispensable for your JIG BORER. The worm-like spiral of the boring heads provides a long, useful cutting surface. Their use insures perfect fitting threads. Correctly designed for precision work.

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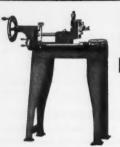
738 Broadway, New York, N.Y.



December, 1941

propriate for the feed of the hob. A set of feed change gears for six feeds between 0.004 and 0.030 inch per revolution of the hob is furnished with each machine.

A handwheel engages the automatic longitudinal feed of the hob spindle slide and an adjustable stop stops it when the work is finished. Simultaneously, the driving motor is switched off. The operator then removes the finished pinion or stack of wheels, reloads the work spindle, returns the hob to its starting position, and again starts the motor and the automatic feed.



#### GRADUATE YOUR OWN FEED DIALS

with a

BADER-GIEBEL

#### GRADUATING MACHINE

Dials up to 12" diameter 5" face for lathes, milling machines, grinders, and other machine tools.

Cuts 4 short lines and 1 long line. Furnished for hand or power operation.

Write for circular

#### **GREAVES MACHINE TOOL CO.**

CINCINNATI, OHIO

A ½ h.p. motor is mounted inside the pedestal and drives the hob spindle by means of a pair of two-step pulleys and a flat belt. Provision is made for maintenance of constant belt tension. Hobspindle speeds of 518 r.p.m. for steel and 1,030 r.p.m. for brass are standard; however, additional motor pulleys cabe furnished to provide for different speeds.

According to the manufacturer, selected materials only are used in making the American Micron Gear Hobbing Machine. For example, the main casings are of Meehanite and the spinds of hardened tool steel or tough S.A. 3140 steel. A self-contained motor pump furnishes a constant flow of coolant from a tank in the base. The returning liquid passes through a settling compartment in the tank.

#### Model No. 830 Midget Toggle Clamp

and

180

Knu-Vise, Inc., 16839 Hamilton Ave., Detroit, Mich., is announcing the Model



Model No. 830 Midget Toggle Clamp

No. 830 Midget Toggle Clamp shown in the illustration. The clamp is furnished complete with spindle and rubber cap measuring 4 x 1½ in. high, and is designed to exert a pressure in excess of 500 pounds.

Because of its small size and great



264

#### If it's STUD SETTING — It's our SPECIALTY

We can supply the proper tool for all sizes and types of stud setting—from 4-40 to 3" and larger if needed. Tools that are designed for small lots or large, for all standard and special types of studs, electric, pneumatic, machine tool or hand drive.

Send us a sample stud or sketch

for practical suggestions

TITAN TOOL COMPANY . FAIRVIEW, PA.

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1941



This machine quickly stamps details and serial numbers into name plates.

Write for Particulars

GEO. T. SCHMIDT, Inc. 1806 Belle Plain Ave. Chicago, III.

# MOREY

**Built In Two Sizes** 

8" Stroke 12" Stroke

Timken bearings for the main spind!e-all others anti - friction. Accurate - simple for toolroom manufacturing. Self-contained motor

drive.

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MOREY MACHINERY CO., INC. 410 Broome Street New York, N.Y. STERLING

#### UNIVERSAL TOOL AND CUTTER GRINDER

Model "C" is completely equipped to perform grinding operations such as cylindrical, surface, internal, angular and face work. One size—10" swing, 18" between centers, 20" longitudinal table travel, 8" cross feed, 8" vertical

Main parts are of ample weight to insure vibrationless operation. Made of scientifically processed cast metal, heat treated. Ways and sliding surfaces hand scraped.

> Write for bulletin giving all data.



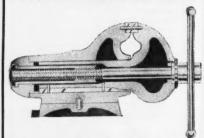
McDONOUGH MFG. CO. EAU CLAIRE, WISCONSIN, U. S. A.

holding power, the Model No. 830 Midget Toggle Clamp is said to be ideally adapted to aircraft work.

#### Illinois Gear Measuring Blocks

Designed to provide industry with a basically improved method for checking pitch diameter and tooth thickness of spur and helical gears, the gear measuring blocks shown herewith have been developed by the Illinois Tool Works, 2501 N. Keeler Ave., Chicago, Ill. The blocks are theoretical rack teeth of known proportions made to

#### The New WILTON Precision SCREW VISE



Entirely new construction, designed to give every essential feature: Securely enclosed . . . No dead motion . . . Greater holding power . . . Precision spindle . . . Electropower . . . Precision spindle . . . Elecast steel head. One year guarantee.

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#### WILTON TOOL CORP.

Stutson & Scowley

180 N. WACKER DRIVE CHICAGO, ILL.



Illinois Gear Measuring Blocks

the exact pitch and pressure angle of the gears to be measured. Because they make contact all along the line of action, the blocks always, it is claimed check the true pitch line condition of thickness and space.

According to the manufacturer, the blocks cannot rock or roll to distort readings, or be affected by minor cutting depressions in the surface, and their flat top surfaces provide a solid seat for micrometer anvils. Other features include great ease of handling and use of a simple mathematical formula all of which combine to provide rapid accurate measurements.

Illinois Gear Measuring Blocks are furnished in sets of three, two males and one female. The two male blocks are used on gears with an even number of teeth, and a combination of one male and one female on gears with an odd number of teeth.

#### Keller No. 2C Wet Cut Power Hack Saw

The Sales Service & Mfg. Co., 473 N. Cleveland Ave., St. Paul, Minn., announces the Keller No. 2C Wet Cut Power Hack Saw shown herewith. The unit has a capacity of 6% x 6% inches and is furnished with a swivel vise to enable the operator to cut angles up to 45 deg. With the vise at a 45-deg.

#### STOPS BREAKING OF TOOL BITS

because a hardened tool steel bearing, electrically welded in place, supports tool bit against heavy cuts.

CATALOG S-41



No. X 1-2-3-4-5

510 IRANISTAN READY TOOL CO . BRIDGEPORT . CONN.

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CUTS - Wire and rods up to 5/8 in. CLIPS - Band iron up to 1/8 x 2 in. MEASURES — Length of pieces.

The lowest-priced wire and band cutter on the market. Every shop, big or small can use a WONDER CUTTER.

Write today for further information and prices.

The Federal Foundry Supply Co. 4606 East 71st St., Cleveland, Ohio

#### **Numbering and Lettering Machine** Easily Operated by Unskilled Help



Marks steel defense parts, name-plates, tags, castings, etc. Also makes name-plates from stain-less steel, sheet iron, aluminum or brass.

> DIES ARE REPLACEABLE

No. 1—Any one size of dies,  $\frac{1}{2}$ " to  $\frac{2}{15}$ "...\$135.00 Throat depth, 3%". Mouth opening, %".

No. 5—Any one size of dies, \$\frac{1}{39}" to \$\frac{1}{9}" \cdot \$.\$175.00 Throat depth, 7\frac{1}{2}". Mouth opening, 3\frac{3}{4}".

No. 7—Any one size of dies, \(\frac{1}{32}\)" to \(\frac{9}{6}\)". \(\frac{2}{3}\)250.00

Throat depth, \(7\)\(\frac{7}{2}\)". Mouth opening, \(3\)3\/\".

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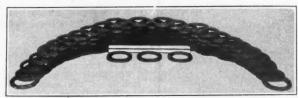
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"Makers of Marking and Numbering Machines"

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PRODUCTION



Part of an Order of Flat-Lapped Seal Rings

More and more manufacturers are coming to realize the importance of smooth, truly flat surfaces where fluids must be sealed by moving parts.

Acme has the knowledge and facilities to provide surfaces as flat as you need them.

May we confer with you on your sealing problem?



Makers of Standardized Jig and Fixture Bushings 212 N. Laflin St.

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#### **MOREY No. 12M** HIGH SPEED VERTICAL PROFILER and MILLER

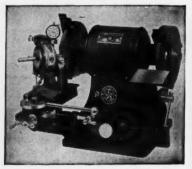
**Preloaded precision** bearings throughout Production of

interchangeable parts requiring milling of any contour or outline can be materially speeded up by this Profiling and Milling Machine.

> Ask for Circular No. 680-A

MOREY MACHINERY CO., INC. New York, N.Y 410 Broome Street

#### PERFECT POINTS ON STANDARD DRILLS SIZES No. 41 to 5/8"



Trim your drill costs with a STAR Precision Drill Grinder. Write for Folder.

Star Machine & Engineering Corp. Division Star Electric Motor Co., BLOOMFIELD, N. J.

angle, the machine has a capacity of inches.

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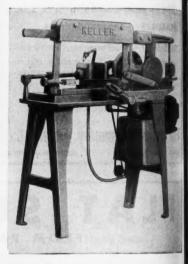
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inches.

The Keller No. 2C Saw employ standard 12-inch blade and is arranged to the control of t Shape with an automatic lift on the rever stroke to ensure long life of the blad By shifting V-belt on pulleys, to speeds from 74 to 140 strokes per mi ute can be obtained. The length stroke is 4 inches.

The machine is provided with the trical equipment, including the monand an automatic stop switch to the the motor when the cut is complete. The weight of the machine with most



Keller No. 2C Wet Cut Power Hack Saw

is approximately 264 lb., and the unit occupies a floor space of approximately 15 x 40 inches.

The Keller Saw is also made in other models of the same capacity; namely, the No. 2-B dry cut with automatic lift and the No. 2-A dry cut without automatic lift. The machine is also available in a No. 1 bench model with a nocitive of A vi. inches pacity of 4 x 4 inches.

The Keller No. 2C Wet Cut Power Hack Saw has many useful features including a vise adjustment, forward or backward, to make use of the entire length of blade on small work. It also has a hinged motor base, which makes it easy for the operator to change speeds when shifting V-belt. The mi-chine is said to be particularly useful in tool and die shops, small manufacturing plants, and repair shops.

December, 194



JIRAIUM — CUNYLD — ANULLS Baverly Throatless Shears cut metal flatIN-ACCURATE—no waste, no distortion. Made of finest steel—PROFITABLE—
INEXPENSIVE! Will last a lifetime!
No. 1—cuts 14 gauge—wt. 18½ lbs.
No. 2—cuts 10 gauge—wt. 33 lbs.
No. 3—(With ball bearing holddown device) cuts figure inch mild steel and 10 gauge stainless steel, wt. 55 lbs.

BEVERLY SHEAR CO.

3004 W. 111th St.

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It also makes change he ma-

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Chicago, III.

Why Use A Shaper to cut Keyways when a

DAVIS KEYSEATER will do the job so much quicker and better?



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#### Automatic Timer for Ace Spot Welders

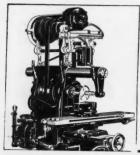
Ace Spot Welders made by the Pier Equipment Mfg. Co., 809 Cross St., Benton Harbor, Mich., are now offered with a precision timer for automatically controlling the welding time period. Thus equipped, the element of human error is said to be eliminated. By means of the timer, welding time, it is claimed, can be quickly selected, hourly production increased, and uniform welds assured. The operator simply feeds the work through the welder.





Automatic Timer Mounted on Ace Spot Welder

In developing the automatic timer, provision has been made for easy adjustment, three concentric scales on a convenient direct - reading dial being provided, as shown in the illustration. The adjustment range of the timer is from 3 to 47 cycles (3/60 to 47/60 of a second) and is calibrated in one cycle steps. Once the timing dial is set for a particular job, pressure on the four pedal of the welder closes the welder contactor, thereby energizing the welding circuit and timing element. At the end of the selected time period, the contactor is automatically tripped and the welding circuit opened.



# Remco gives more for your money.

Remco Drives cut power cost, boost out-put, reduce everhead, save floor space, etc. Unlike ordinary drives, the Remco takes any motor of reasonable size—new or USED. Patented universal motor mounting does the trick. No new machines nor motors, to buy. Motor switched instantly in case of "burn out." Smaller h.p. motor used. Quickly applied. Low cost. Writel Remco Products Corp., State and Hay Sts., York, Pa.

#### REMCO MOTOR DRIVES

for LATHES, SHAPERS, DRILLS, MILLING MACHINES, etc.

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1. SAVE the cost of expensive drill fixmres. You only need a simple bushing plate and adaptor for each job.

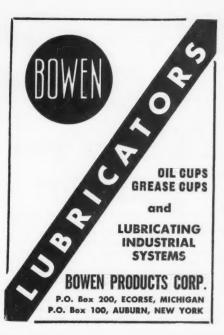
2. SAVE in tooling time. Build your fixture around a completely pre-designed drill jig body.

3, SAVE in production costs. Savings up to 60% in drilling time are not uncommon. Lever locks work instantly holds securely. Throw it back and work is released. No complicated adjustments.

Let us send a vise for 10 DAYS FREE EXAMINATION or write for illustrated folder

Chicago, III.

MOHR LINO-SAW CO. 122 N. Union Ave.



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Selected for Schranes Hydraulic Lapping Machines

One of the outstanding advantages of Pullmore Clutches is adaptability . . . and this is one of the resons why Pullmore Clutches are standard equipment in the complete line of Schraner lapping Machines. Model B Schraner, shown been, has automatic operating cycle, also separate push button control that includes independent engagement and release of the No. 5 Single-type Pullmore Clutch in the gear box.

Other advantages of Pullmore Clutches which influenced their selection by Schraner engineers are. Easy installation and operation, powerful pull, reliability, durability, easy adjustment, and economy. These features also make Pullmore Clutches notably successful in various other machine tools and automatic or semi-automatic machinery of many other types. Investigate. Ask also about our free engineering service.

was are sold by MORSE CHAIN CO. offices in principal cities. Rockford Drilling Machine Division Corporation 300 Catherine Street, Rockford, Illinois, U.S.A.

Pullmore Clutches are made in single and double types, for operation in oil or dry, in a complete range of capacities from 1 h.p. to 75 h.p. at 500 r.p.m. Write today for data on uses and specifications.



Double-Type Pullmore Clutch







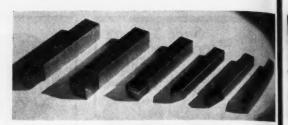


ROCKFORD



#### Tungsten Carbide-Tipped Cutting Tools

The timer is of the electronic or tube type, with maximum timing variation controlled to a plus or minus 1/20 of a second on short time welding. Since the timer has no relays or other moving elements, timing adjustments are said to be accurately maintained.



ing, and facing requirements, and may be readily converted by the user into special shapes by simple grinding operations.

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All tools are available with tips of various grades of Vascaloy, Carbolo, Kennametal, or Firthite. For identification purposes, the styles and sizes suitable for cast iron and non-ferrous metals are furnished with gray shanks Those for steel have black shanks.

#### Tungsten Carbide-Tipped **Cutting Tools**

To meet demands for carbide-tipped cutting tools, the Tungsten Carbide Tool Co., Subsidiary of Michigan Tool Co., Detroit, Mich., announces a com-plete line of standard stock tools comprising six styles and 46 sizes. All tools have diamond ground edges and are supplied ready for immediate use. Types suitable for cast iron, non-ferrous metals, and steel are included in the line. The tools are designed to cover a large majority of turning, bor-

#### Atkomatic High Pressure Valves

According to an announcement made by E. C. Atkins & Co., 466 S. Illinois St., Indianapolis, Ind., the standard line of Atkomatic Valves for operating pres-

# **Machines**



No. 4 Motor Driven Milling Machine

Mounted on Cabinet Column

Burke motor driven milling machines Nes. 1, 2, 3, and 4 are specially suited for handling small, difficult work on a production basis.

Write for complete information.

# BURKE MACHINE TOOL CO.

297 E. 16th St.

Conneaut, Ohio

# SPEED UP!

## With the CATSKILL Model W-Wet Type **Abrasive Cut-Off Machine**

Fast, smooth cuts in solids to 2", tubings and shapes to 3". Will not burn or leave objectionable burr. High alloyed hard steel and many other materials.

Write for detailed information, Bulletin No. 2.



# CATSKILL METAL WORKS, INC.

CATSKILL

NEW YORK

DANLY KWIK-KLAMPS TOGGLE CLAMPS FOR QUICK, POSITIVE CLAMPING IN ANY POSITION

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STANDARD HALF TURN OR

STRAIGHT CLAMPING BAR

DANLY MACHINE SPECIALTIES, INC. 2100 SOUTH 52nd AVENUE - CHICAGO ILWAUKEE - LONG ISLAND CITY, N. Y. - DAYTON DETROIT - ROCHESTER - CLEVELAND - PHILADELPHIA DUCOMMUN METALS & SUPPLY CO. LOS ANGELES, CALIF. - SAN FRANCISCO, CALIF.

DIE SETS and DIE MAKERS' SUPPLIES U. S. HEADS

STANDARD SINCE 1915



The United States Drill Head Co.

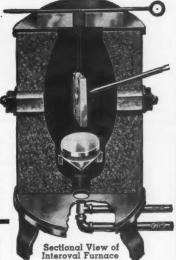
1954 Riverside Drive CINCINNATI, OHIO

the heat treating FURNACE that industry's looking for, at HALF the PRICE

The INTEROVAL FURNACE is the product of almost a half century of heat treating experience, for hardening expensive tools and dies safely and accurately. No possibility of surface decarburization or distortion. Heat treats "Moly" steels without any trace of scale or soft skin.

Overall size—32" high  $\times$  20" in diameter. Heating chamber—14" high, 9" in diameter at center, 7" in diameter at top. Weight-550 lbs.

This furnace is gas-fired and can be operated at an average cost of 25c per hour for fuel. Heats to 2350° F. in 40 minutes. Non-oxidizing atmosphere. May be quickly converted into lead, cyanide or salt bath furnace. Send for new folder giving complete information.



Bennett 130 SOUTH ST.

INSURED STEEL TREATING CO.

NEWARK, N. J.

sures up to 300 lb. has been supplemented with a line of high pressure valves for operating pressures up to 3,000 lb. These valves are made in ½, ¼, and 1½-inch sizes and can be furnished for standard currents. Under certain conditions, when used on liquids, a specified amount of timing control may be obtained on opening and closing speeds.

The illustration shows Atkomatic High Pressure Valves operating a 250-ton press at 1,000 lb. oil pressure, with full remote control. When the press reaches full load, the pressure immediately returns to original accumulate pressure with no time lag due to a special automatic arrangement.

Atkomatic High Pressure Valves am

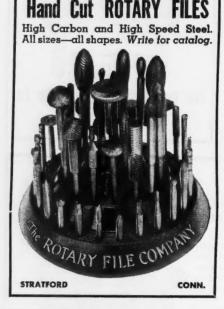


Atkomatic High Pressure Valves operating a 250-ton press at 1,000 lb. oil pressure

said to offer great possibilities in the general industrial field for automatic and remote control. Valves are brome with packless, renewable seats and discs, and screwed ends. Seat diameters can be furnished up to full pipe size. A bubble-tight pilot assembly is available for air and gas operation.

#### Lincoln Protective Control Device for Arc Welding Machines

Complete protection against heat or excessive current, or both, is said to be provided by a protective control device for arc welding machines announced by The Lincoln Electric Co., Cleveland. Ohio. According to the manufacturer.





## THOR STAMPS LAST LONGER

You get more marks per dollar with THOR STAMPS. They're made of correctly-heated alloy steel. Central striking point gives uniform indentation. Thumb side marking makes them easily read-easily used. Write for catalog.

## PITTSBURGH STAMP

812 CANAL ST.

PITTSBURGH, PA.

MODERN MACHINE SHOP

December, 1941

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With considerable experience and exceptional facilities for the manufacture of high precision Small Gears, our manufacturing capacity is now heavily burdened with National Defense work, and we naturally feel pardonable pride in the importance and quality of our contributions to the Program.

While this very essential work takes precedence, we are keenly conscious of our duty to established customers; their needs must command our continued earnest efforts. Under such circumstances, we hope new inquirers will understand our inability to give their wants the consideration they would ordinarily receive.

Gear Specialties

A ROUGH TOUGH JOB

Made Easy WITH



# BISCO TOOL STEEL

• Five sections of 7" BISCO Tool Steel Tubing are used in the above die to stamp out circles of sandpaper. In spite of constant abrasive action, BISCO tubes offer rugged resistance.

No time or money are wasted on costly boring operations with BISCO Tubing. We cut it to any size from our warehouse stock and deliver it ready for use.

Free Catalog on Request

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943 East 67th St. - Cleveland, Ohio - HEnderson 0995

# "Quick Way" High Speed Power Hack Saw Blade Grinding Fixture



Everyone connected with metal cutting and shaping knows that correct and frequent grinding of tools is absolutely necessary. You would never allow a mechanic to use a dull broach or a dull drill. You require that all tools be sharp before using and be reground the moment dullness begins.

THIS NECESSARY PRACTICE HAS BEEN NEGLECTED IN REGARD TO POWER HACK SAW BLADES. THIS NEW METHOD OF GRINDING BLADES NOT ONLY INCREASES CUTTING EFFICIENCY BUT EFFECTS GREAT SAVING IN BLADES AS WELL.

Quotation Furnished Upon Application. Write for Illustrated Folder.

Industrial Engineering Co., Inc. P. O. Box 433, 311 Sixth Avenue, South

MINNEAPOLIS

December, 1941

MINNESOTA



Lincoln Protective Control Device Mounted on "Shield-Arc" Welder

a welding machine equipped with the device, which provides protection against burnout, can be operated at maximum capacity for long periods without harm.

The protective control device consi two current transformers (up) units in illustration), the primaries which are connected in series with The secondaries sur motor leads. power to operate two snap-action mostats which are mounted directly the motor lamination (lower device illustration). The thermostats are nected to the lamination in such a w that they operate by means of he conduction as well as by current party ing through the thermostats.

The protection provided by the Licoln Protective Control Device is e plained by the manufacturer as follow

If the welder is being operated in very hot room or in an oven and it e ceeds the safe operating temperature the thermostats will trip open.

If the motor is cold and excessive currents which will eventually damage the motor occur for a short period of time, the thermostats will operate be-fore the motor reaches an unsafe tem

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If the machine is started on singi phase lines, the switch may close by the excessive heating of the therm stats caused by the single phase locked current will open the thermostats and stop the machine.





NEW Quick Set Machine. One wheel can be turned quickly by knurled knob for consecutive numbering.

NUMBERALL STAMP & TOOL CO. Huguenot Park, Staten Island, N. Y.

# WHITNEY MILLING CUTTERS

for Uniform Seating of Whitney Woodruff-type Keys



No need for skilled labor ... or for filing and fitting . . . when Whitney Milling Cutters are used for seating Whitney Keys. Cutters are made in all sizes to correspond with the keys which can't roll over. Complete information in Catalog V-111. Write.

The Whitney Chain & Mig.Co HARTFORD, CONNECTICUT

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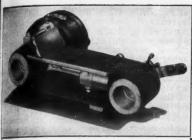
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#### An Inexpensive ABRASIVE GRINDER ...

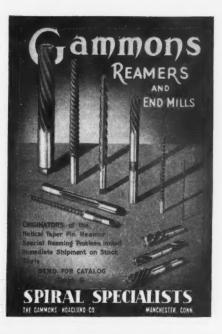
"Built Like a Machine Tool"

The Hormel-M Grinder is sturdily built with lae hormer-by written is sturing built with a supporting leg under the grinding table to eliminate vibration and tipping due to pressure on the belt. Ball bearing throughout. Equipped with ALEMITE LUBRICATION complete with grease gun.

Write for illustrated folder on this and other styles and sixes.

### HORMEL-M GRINDER WALLS SALES CORP. NEW YORK, N. Y.

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# **JEFFERSON**

"BULL DOG" MACHINES

This motor driven precision milling machine is capable of close tolerances on die sinking, contour profiling, angular milling, jig boring, routing of ferrous and non-ferrous metals for production line or toolroom. Has 4 spindle speeds, 200, 400, 700 and 1000 R.P.M.

The table is equipped with 3 T slots to accommodate standard T bolts for tightly clamping work or fixtures. Write for details.

JEFFERSON MACHINE TOOL CO. INCINN HIO

December, 1941

MODERN MACHINE SHOP

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If the machine is running and one fuse blows so that the motor is operating single phase, if the load on the machine is sufficient to overheat the motor, the thermostats will trip open.

If the rotor is locked with normal

three phase power applied, the thermostats will open the circuit due to the

high current.

If the welder is operated for long periods of time at sustained overloads, both high input current and high motor temperature combine to open the thermostata

The thermostats automatically reset when the motor returns to a safe oper-

TEVENS ROTARY TABLES STANDARD AND DIAL TYPES



Write for circular. Four sizes; two types of each.

Table graduated for single degree reading. Precision and acyears' experience designing circular attach-

JOHN B. STEVENS INC. NEW YORK, N.Y. 482 CANAL ST.

## BETTER RIVETING AT LOWER COST



## **LINLEY Noiseless Rotary Rivet Spinning** Machine

Made in a wide range of sizes and types for iron or cold rolled steel rivets up to 3½". Also larger rivets of softer materials. 3½% chrome nickel steel spindles, heat treated and ground are supported at ground are supported at lower end in a double row radial thrust bearing which carries radial load AND riveting thrust load.

Write for complete details.

LINLEY BROS. CO. 15 Montauk St. Bridgeport, Conn.

ating temperature or when the current is reduced, and no manual operation is required to start the machine except pressure on the start button. A special circuit permits the start button to be held "in" after the welder thermostate have been tripped. This allows the machine to rotate with no load, and the welder ventilation speeds up the cooling of the welder after the trouble has been rectified.

By reducing the danger of burnouts under every possible condition, the Lin-coln Protective Control Device represents a distinct advance in serviceabil. ity, economy, and long life of the are welding machine. It has particular application in present - day production welding which requires continuous operation of arc welding generators at the maximum current which they will safely deliver to meet demands for production welding at greatest possible speeds.

#### Eastern Model "D" Air Power Pump

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The Eastern Engineering Co., 40 Fox St., New Haven, Conn., announces the addition of a Model "D" air powered pump to its line of midget size pumps. The outstanding features of the pump are the air powered motor, which is said to make the pump absolutely explosion-proof, the variable performance (controlled by varying the speed of the air motor), and the performance characteristics in relation to the size of the pump. The pump can be used in all in dustrial plants, laboratory and expermental applications where an explosionproof unit is necessary and where com-pressed air is available. The unit is also said to be ideal where variable performance is required.

The Eastern Model D Air Powered

## T. H. LEWTHWAITE MACHINE CO.

PUNCHES CUTTERS BENDERS SPECIAL TOOLS

PUNCHES and DIES for round, square and other shaped holes.

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Styles 7 x 17 and 6 x 13



Developed to meet demand for chucks lower than our standard

Send for folder covering Chucks and Demagnetizers.

& H. ELECTRIC CO.

202 Richmond St. Providence, R. I.

#### How Much Is "SAFETY" Worth To You?

"KEEP YOUR PLANT IN PRODUCTION 24 HOURS A DAY"

To meet this demand of the National Defense Program it is necessary that you take every precaution to prevent accidents to your workers. SAFETY WEDGE GRIP STAMPS are constructed to give the maximum of Safety and Service on any stamping job. For a few extra dollars it is possible to purchase these stamps, which will NOT Spall or Mushroom, and assure at least 50% to 100% more Safety and Safety Wedge Service.



Prices and circular sent on request.

M. E. CUNNINGHAM CO. 158 E. CARSON ST. PITTSBURGH, PA.

CERROMATRIX can save precious time in your toolroom

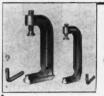
Defense demands have kept many a busy die maker awake nights. Many companies have discovered that they can greatly lighten their burden through the use of CERROMATRIX. This low-temperature-melting alloy, which expands slightly on solidifying, secures punch and die parts swiftly and accurately, eliminating most of the time-consuming fitting-and-filing labor of older methods. For example, six hours were saved in making the punch shown here.

Cerromatrix can also be used in a wide variety of other applications. Send for the free Cerromatrix Manual.

CERRO DE PASCO COPPER CORPORATI

40 Wall Street New York, N. Y. British Associates: Mining & Chemical Products Ltd., London Canadian Distributors: Dominion Merchants Ltd., Montreal Pump is of a centrifugal type, with total internal volume of 50 cubic centimeters. The pump is 5½ x 6 x 7 inches in size and weighs 10 lb. The motor is a ¼ h.p. ball bearing vane type, with air consumption of 5 cubic feet per minute at maximum speed. The motor has a maximum speed of 4,000 r.p.m. on 100 lb. maximum air pressure and is equipped with an exhaust silencer and oil catcher.

The stuffing box of the Model D pump is accurately adjustable by means of an easily accessible adjustment ring.



## Cut Set-Up Time

75% through use of the New Advance Clamps (the only T-slot clamps) Clamp directly over work. For use on all machines with T-slots. Standard and Heavy-Duty type illustrated.

Write for circulars.

ADVANCE MACHINE WORKS Fort Wayne, Indiana 3727 Weisser Park





Eastern Model "D" Air Powered Page

The pump impeller is mounted on end of the motor countershaft, then eliminating the need for a coupling assuring perfect alignment. The non of the pump are threaded for 1/4 standard pipe fittings.

Operating on 100 lb. air pressure, Eastern Model D Pump has a maxim capacity of 15 gal. per minute and maximum pressure of 34 lb. per inch. Operating on 50 lb. air press the pump has a maximum capacity 12 gal. per minute and maximum m sure of 24 lb. per sq. inch, and on N air pressure, a maximum capacity 7½ gal. per minute and maximum m sure of 13 lb. per sq. inch.

The Eastern Model D Air Pow Pump is available in stainless Monel metal, chromium plated by brass, cast iron, Hastelloy, and of allovs.

SPOT WELDERS MORE PRODUCTION LOWER COST

Features include: transformer which guarantees faster heat, stronger welds; water cooled electrodes and tips; automatic trip switch; adjustable arms; swivel pedal; and heat regulator. If you have any production problems-consult us.

Alphil Spot Welding Co. -431 W. Broadway, New York



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#### RAY Micrometer FFSET BORING HEADS

... helps carry the load thrown on the a carrying block — keeps chips from cometer mechanism — eliminates sharp mess that might catch on operator — antains full strength with all the advanges of round construction. An exclusive dure.

RAY MACHINE TOOL CO.

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# WHITNEY-JENSEN No. 58 TOGGLE ACTION FOOT PRESS



POWERFUL - ACCURATE - DURABLE Mit is not the ordinary Foot Press, but a toggle edian; no kick or violent force necessary; only for pressure to create a 3½ ton pressure per mars inch.

WHITNEY METAL TOOL CO. HOCKFORD, 110 Forbes St. ILLINOIS



# Speed Control is Production Control

Machine tools equipped with Given Vari-Speed Motor Drives put instant and infinitely variable speed control at the command of the operator. No time is lost in starting, stopping, changing gears or belts. Any desired speed is obtained while in operation. No tool marks. No vibration. Note convenient location of hand wheel.

Given Vari-Speed Drives are mechanically correct. Precision built. Economical. Safe. Most original, direct and efficient method of modernizing old tools and getting them back into up-to-date production at once. Immediate delivery in sizes from 1 to 7½ h.p. Fully guaranteed. Sold on approval—money back in 60 days if not absolutely satisfactory. Send for bulletin.

GIVEN MACHINERY COMPANY 2014 SANTA FE AVENUE LOS ANGELES. CALIFORNIA

GIVEN VARI-SPEED DRIVE

#### "Loc-Key-Set" Feature for "Big-Hed" Diamond Nib

The Diamond Tool Co., Chicago, Ill., announces an unusual design feature for its "Big-Hed" Diamond Nib. The fea-ture, which is known as the "Loc-Key-Set," consists of two internal locking keys that are integrally cast on the diamond holding slug of the nib by forcing the molten metal into two internal key seats milled in the nib head. According to the manufacturer, diamonds set in this manner cannot shift, turn, or loosen in operation, thus permitting

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9", 12", 15", 18", 21", and 25" With or Without Dividing Plates. Ask your dealer or write us for complete eight page catalog.

Moderately Priced

more accurate feeding and control the point while dressing.

Other features of the nib are a lan

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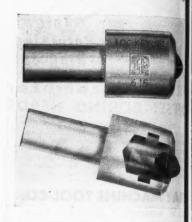
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Feature

"Big-Hed" Diamond Nib with "Loc-Key-Sel

diameter head which draws heat away diameter head which draws heat awa from the grinding point and dissipate it rapidly, thus providing cool dressing preventing tool expansion, and permi-ting the holding of close tolerances, and corrected face angles, which permi greater tool clearance without loss of tool strength or rigidity.

#### Link-Belt Self-Aligning Idler for Flat-Roll Conveyor Belts

A swiveling, positive, self-aligning idler for automatically correcting misalignment of either carrying or return runs of non-reversing conveyor belts supported on flat-roll idlers is announced by the Link-Belt Co., Indianapolis, Ind



DROP FORGED STEEL

Standardized Die Sets, embodying many exclusive features, a listing of more than 195,000 stock sizes and 46 different styles afford a service that is unsurpassed.

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SAVAGE NIBBLING MACHINE

FOR TUBE SLOTTING AND TUBE SHAPING— FOR FAST AND ACCURATE CUTTING OF FLAT SHEETS BY TEMPLATE OR TO A SCRIBED LINE.



Showing Tube Cutting Attachments and Samples of Work

Cutting Capacities

Flat Sheets Mild Steel 3/4" Tough Alloys 3/6"

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Wall thickness to 18"
1" I.D. to 36" O.D.

Throat Depth 9" to 36"

Ask for BULLETIN "F"

Manufactured by

W. J. SAVAGE COMPANY

Pioneer Manufacturers of Nibbling Machines

# **Junkin Safety Guards**

Assure:

Protection

 Increased Production

Safety is assured by the exclusive JUNKIN TRIPLE INTERLOCK which locks presses until

guards are safe.

For safety, economy and efficiency equip your presses with Junkin Safety Guards. Recommended for all type inclinable and small presses.

Write for facts and prices

JUNKIN SAFETY APPLIANCE CO., INC. 930 W. HILL ST. LOUISVILLE, KY.

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# STEEL FOREMAN'S DESK

It's new . . . it's useful! And you'll find it popular in every corner of the shop for the safe keeping of records, etc. Many styles and models plus a wide variety of interchangeable drawer, cabinet and top units.

You'll like the prices, too... write today!

STANDARD PRESSED STEEL CO.

Box 556, Jenkintown, Pa.



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December, 1941

MODERN MACHINE SHOP

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Loc-Key-Set

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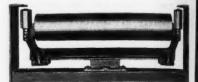
troit, Mid.

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The idler has a centrally pivoted cross member which, besides being equipped with a flat idler roll for supporting the belt, has a vertically mounted actuating roll at each end which lightly contacts the edge of the belt when its lateral misalignment exceeds a predetermined amount. Since but a slight pressure of the belt edge against the actuating roll serves to swivel the idler unit on its pivot sufficiently to guide the belt automatically, quickly, and positively back to proper alignment, any possibility of injury to belt edge is said to be eliminated.

When used on return runs, one idler

should be placed close to the tail or take-up shaft so that the belt will be guided centrally on the pulley, and one



Link-Belt Self-Aligning Idler for Flat-Roll Conveyor Belts

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at every 10 or 15 idler spaces. On the carrying run, one idler should be placed just beyond the loading chute and one at every 10 or 15 spaces thereafter. For flat-roll belt conveyors that must operate in either direction, self-aligning idlers of special design are available.

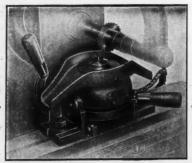
# F. 000

# M-D Facing Heads With Automatic Feed

Can be attached to Column Boring Bar, and Drilling or Milling Machine spindles. Single point tool travels radially, from center outward or reverse, feeds automatically and covers faces 6" to 30".

Write for circular.

MUMMERT-DIXON CO. 120 PHILADELPHIA ST., HANOVER, PA.



#### DEARBORN Automatic Chucking and Indexing Fixture MILLS OVER 1000 PARTS PER HOUR

Work held by draw in collets. Collets open and close automatically. Work automatically ejected. Indexes without loss of time for milling 1, 2, 3, 4, 6, 8, 12 or 24 sided pieces. Minimum set-up time required. Speeds up production. Positive and accurate in operation.

J. W. DEARBORN

70 S. CLIFF ST. . ANSONIA, CONN.

#### Amco Brand "K" Metallic Coating Powder

A metal coating compound to be known as Amco Brand "K" Metallic Coating Powder has been developed by the American Solder & Flux Co., Treaton Ave. and Norris St., Philadelphia. Pa. The compound is designed for making repairs to damaged tin coatings.

While the finished coating has the appearance of tin and matches perfectly with the surrounding hot dipped the coating, it is said to have an advantage not possessed by the original tin; namely, it is completely rust resistant and will protect the underlying iron or stell to the same extent as a hot dipped sine coating of the same thickness. This unusual and important property is due to the fact that when in contact with iron or steel in a corrosive medium, the Amco Brand "K" Coating is electro-



DRILL THESE HOLES

By a Quick, Easy, Inexpensive Method Your business letterhead will bring literature. WATTS BROS. TOOL WORKS WILMERDING, PA.

December

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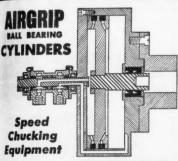
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ber, 1941



Patent No. 1,851,723

The operation of all types of Chucking Equipment can be profitably accelerated with Airgrip Ball Bearing Cylinders, accuracy promoted and time formerly spent in adjusting trueing, etc., saved for production. Maptable also to many other types of workware air control can be efficiently applied. Write us for application suggestions and quotations.

AIRGRIP CHUCK DIVISION OF ANKER - HOLTH MANUFACTURING CO. 28th & CONNERS ST., PORT HURON, MICH.

# compound dies

Produce Accurate Parts in One Operation They are most satisfactory when used in WAL-THAM CYLIN-DRICAL SUB-PRESSES where



ARCH TYPE

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Waltham

Massachusetts

accurate alignment is not only attained but maintained. We

can furnish these Subpresses in

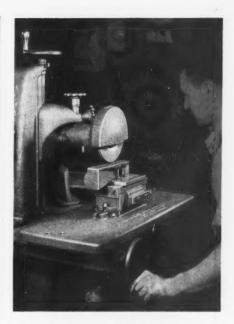
nine diameters of

ing with or with-out roll feed. Use the overhang type for second operation work requiring

plungers. arch type is used for strip punch-

positioning.

The



#### BUILDERS "T" SURFACE GRINDER

"We can do SMALL TOOL AND DIE GRINDING CHEAPER ON THIS MA-CHINE than on our large automatics which not only require greater set-up time but, due to over-travel and less flexibility, longer grinding time, too." That, in essence, is what users tell us. Machines are moderately priced, that it pays to install them at points convenient to the men who frequenly have small grinding to do.

SEND FOR BULLETIN 644





#### BUILDERS IRON FOUNDRY

19 Codding Street RHODE ISLAND PROVIDENCE

positive and therefore affords protection against rust and corrosion.

Amco Brand "K" is intended for use wherever an original tin coating has been damaged in handling, worn away through use, or burned away in a welding operation. Since the melting point of the material is lower than that of tin, the original coating is said not to be melted or disturbed in any way by the application. The coating on the repaired areas joins with the undamaged surrounding areas of tin, thus forming a continuous and protective surface.

Since the finished job looks the same as tin, Brand "K" may be used wher-

ever appearance is a factor. It is quite satisfactory for use on those surfaces food containers which do not come in direct contact with the food itself.

#### Stackbin Slant-Box Rack

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Designed to store ordinary shop boxe at an angle which effectively conver them into hopper-fronted storage bin



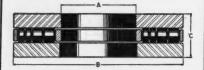
Stackbin Slant-Box Rack

and automatically feeds contents toward the front, a line of Slant-Box Racks is now being marketed by the Stackin Corp., 53 Troy St., Providence, R l Slant-Box Racks are individual no of welded steel construction which be terlock to form storage units of by desired shape or capacity.

In the Slant-Box Racks, contents of boxes are always visible and instant accessible. Tilted runners hold boxes a the proper angle and a wide lip keep them firmly in position. The use of standard Stackrack construction permits high stacking in interlocking units which form a storage rack of any desired height, shape, or capacity.

Made entirely of heavy angle as

channel steel, with all joints welded





TYPE RT

#### ROLLER THRUST BEARINGS

· Made with flat seats and in a variety of self-aligning types.

These bearings are especially adapted for heavy loads at slow or moderate speeds. Standard sizes are shown in our general catalog, sent upon request.

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358 FURMAN ST. BROOKLYN, N. Y.

NO BELT SLIPS WITH VACUUM CUP C. I. PULLEYS



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30 Day Free Trial Offer.

Stock most Std. Sizes to 16" Dia. Supply sizes 2" to 72" Dia.

Shut Off Expense Caused by Slippage You Save Money on Every Installation

NEW LOW PRICED PRODUCTION LINE

SEE PART LIST Prices Below Send for List-On the Shell Dia. Face Price Dia. Face Price

2 "x2\"-\$1.25 2\"x2\"- 1.45 4 "x31"-\$2.85 41"x51"- 3.95 We Supply Fractional Dia. and Face Pulleys-From La

Casting Stock VACUUM CUP METAL PULLEY CO., INC Detroit, Mich 12536 Grand River Ave.,

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# NEW Taylor "HI-DUTY" Production Drilling Machine Moderately Priced MODEL F-400

Capacity 1/32" to 1/2"

MANY OUTSTANDING FEATURES

Investigate
Today!



## TAYLOR MFG. CO.

056 W. Meinecke Ave. • Milwaukee, Wis.

## MILWAUKEE SURFACE PLATES

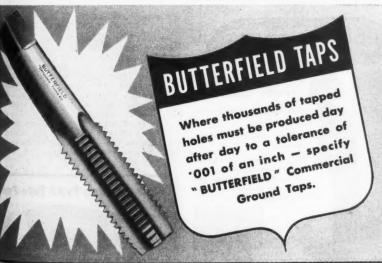


accurately machined. Securely mounted cast legs are machined and provided with adjusting screws for perfect alignment. Shipping weight, 1300 lbs. Also larger or smaller plates with planed or acraped surface. We also manufacture angles and parallels as shown underneath surface plate.

Write for details.

#### J. C. BUSCH CO.

Engineers and Machinists Since 1907 126 E. PITTSBURGH AVE., MILWAUKEE, WIS.



# UNION TWIST DRILL CO. BUTTERFIELD DIVISION

Factories: DERBY LINE, VERNONT, U. S. A. ATHOL, MASS.; MANSFIELD, MASS.; ROCK ISLAND, QUEBEC, CAN.

Slant-Box Racks provide rigid, permanent storage facilities, which can be changed or added to as conditions demand. Made in sizes to fit boxes now in use, Slant-Box Racks save space, time, and labor by converting present boxes into efficient hopper-fronted bins.

#### Marquette Model 200 BB A.C. Arc Welder

Illustrated herewith is the Marquette Model 200 BB A.C. Arc Welder which is now being marketed by the Mar-

## Accurate Hole Transfer Made Easy With NIELSEN TRANSFER SCREWS



Simply insert in holes, invert, strike sharply and you have centers and drill circles perfectly located. Reduce time and eliminate spoilage of other methods. 7 sizes U.S.S. Inexpensive — Last for years. Write for Circular

NIELSEN TOOL & 1863 Gardner Ave. Berkley, Mich.





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Marquette Model 200 BB A.C. Arc Welder

Mfg. Co., Inc., Minneapel Minn. The wide range of welding a pacity and fast starting even flow a power are said to make the Model BB an ideal welder for general main nance work. According to the manufac turer, it is easy to handle, east moved, and can be used for both is

and heavy welding jobs.

Designed for use with electrodes for to 18 inch inclusive, the Model M BB welder has a range of from 20 is 200 amperes and is constructed for oper

#### New Nesting Type Tote Parts

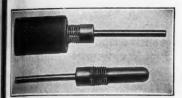


20" long x 12" wide x 61/2" deep. 16 ga., drag holes and handles both ends

J. L. LUCAS & SON, INC. Bridgeport, Cen 1 Fox Street

December, 194 December

# **NEW** FLEXIBLE ABRASIVE WHEEL



Designed for precision work. Used for removing burs, fins, tool marks on various types of production work. A very indispensable aid in speeding up production.

Write for catalog and free sample.

Field Abrasive Specialty Mfg. Co.



#### NO. 601 TURRET LATHE

You can tool this machine for a wide range of bar and chucking operations, Equipped with either lever-operated, hand indexed turret or with plain saddle. Worm drive or direct drive as required. A high quality machine at a moderate price.

WRITE FOR CATALOG 27-A

HE OSTER MANUFACTURING CO. 2061 EAST 61st STREET CLEVELAND, OHIO



## A TIME SAVER IN TOOLING UP FOR DEFENSE WORK

Boyar-Schultz Profile Grinder No. 2, a precision machine tool for shortening the time required in grinding and fitting irregular and odd shaped surfaces in dies and punches, cams, templates and similar work.

With two motors and two independently oscillating spindles operating at 10,000 R.P.M., this Profile Grinder will handle work of the most complicated kind.

WRITE FOR LITERATURE

BOYAR-SCHULTZ CORPORATION
2120 WALNUT STREET • CHICAGO, ILLINOIS

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ation on 220 volt, 60 cycle alternating Accurately calibrated heat current. stages are plainly marked to assure the operator the correct heat for every job. Positive mechanical and electrical connections are made through large solid tapered terminal sockets and cable plugs.

The Marquette Model 200 BB A.C. Arc Welder has a cabinet which is 25% inches high, 18 inches wide, and 14% The welder weighs 235 lb. inches deep. and is furnished complete with 8-foot power cord, plug and wall receptacle, 15-foot No. 2 extra flexible welding cable complete with high grade, all

GRAY TURRET HEAD METAL CUTTER OR NIBBLER

GRAY, Originator of First

Practical Metal Cutter or Nibbler Most modern Nibbler for Template Cutting, Tool Rooms, Shipbuilding, Aircraft Parts,

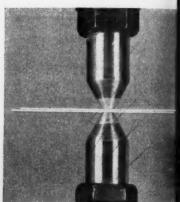
Aircraft Tubing, Sheet and Plate Shops.

GRAY MACHINE CO. Box 596, Philadelphia, Pa.

bronze electrode holder and taper pain connection, 15-foot No. 2 fin ground cable complete with spec designed ground clamp and taper in connection, No. 11 Marquette Vision Helmet equipped with high m No. 10 lens, and an assortment of m ing electrodes. Welders for open on 440 and 550 or other special volta can be obtained on order.

#### Progressive Special Electrodes Spot Welding of Aluminum

A line of special electrodes for welding of aluminum is now available



Progressive Special Electrodes for Spi Welding of Aluminum

E. Outer Drive, Detroit, Mich. The trodes have inserted tips of a spe alloy designed to resist mushroom

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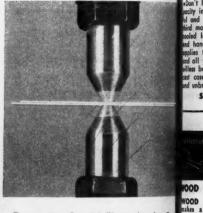
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#### Fastest and best known means of cutting sheet steel, aluminum and magnesium sprues, gates, risers, and kindred items. Provides sawblade travel of over 2miles per minute with PERFECT SAFETY. Cuts are exceptionally smooth. Write for Metal Cutting Band Saw Bulletin.

METAL CUTTING BAND SAWS

THE TANNEWITZ WORKS GRAND RAPIDS, MICHIGAN

SAVES YOU TIME - MONEY - SPACE

Saves time because all stock is in vie No looking around. Saves money because original cost is low. Saves spec because original cost is low. Saves 19th because very little required. 4 arm, 3 high, stacks 10,000 lbs. flot or row stock; 5 arms, 57" high, 12,000 li Tubing less weight—3 stands for 2 lengths or 2 for 12' or shorter. We against wall or back to back in cent of room. Small cost—big value.

WM. S. YOHE SUPPLY CO. 505 Gibbs Ave. N. E., Canton,

MODERN MACHINE SHOP

December, I

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Don't let the price fool you. This is a real full casiden't let me price tool you. Into is a real full cookin industrial \( \frac{1}{2} \) " drill— a handler, more powerist and all-around better drill than many costing a
tid more. Specially wound, high torque, forced-air
coded longlife motor. Improved design breast plate
ed handle—at lost, a "natural grip" handle that
splies thust in a direct line with the drill point,
and all the features common to other quality drills—
liter hearings, stiding thumb switch streamlined die silless bearings, sliding thumb switch, streamlined die at case, removable side handle, waterproof cord and unbreakable plug.

SPEEDWAY MANUFACTURING CO. 1825 So. 52nd Ave., Cicero, III.



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makes a clumsy tool
that will split and crack.
METAL has edges that turn. heak and fly off.

NAME AND THE STREET OF T MANHUE heads and faces stay accurate, absorb shock and wear longest.

 Chicago Rawhide Ham-mers and Mallets are the tools for striking hard ac-curate blows safely on any surface that must not be cracked, battered or marred. The tough Java Water Buffalo hide, coiled. compressed and treated for long life will not split, break or even dent, and has resilience to absorb rebound for easier, accurate blows.



This hammer and mallet with genuine tawhide heads are quality tools for thrifty onics. Sold by industrial supply houses everywhere.

CHICAGO 7 128 ELSTON AVE - CHICAGO - U-S-A



### "Grind and Quench" THAT'S BAD!

The old "grind and quench" method naturally doesn't do tools any good but there hasn't been a satisfactory Wet Grinder made until now. The Hisey Wet Grinder affords a continuous, adjustable flow of coolant, and the nozzle can be placed to direct the coolant where it will do most good. The pan is so designed to return the coolant to the reservoir without drenching the operator. It's a simple matter to change wheels.

#### NO DUST COLLECTING SYSTEM

is required in Wet Grinding as all dust and grit is carried away with the water much more effectively than with an air-suction fan. This means more protection to your machinery and your employees' lungs.

Made in a number of types and sizes from 10 to 30 inch wheels. One motor drives both pump and wheels through V belts. Any available motor may be used.

Write for Catalog 60BM

The HISEY-WOLF MACHINE Co. Cincinnati, Ohio

and reduce pick-up. The tips may be obtained in virtually any type of standard or special electrodes shape desired.

Improved Lid-Lifter for Homocarb Cooling Unit

Leeds & Northrup Co., 4934 Stenton Ave., Philadelphia, Pa., announces an improved lid-lifter for its Homocarb Cooling Unit. Ruggedly constructed for long service, the lid-lifter consists of a lever acting on a roller fulcrum, and is According to the manufacturer, the



designed to provide an easy, horizontal

lift of the cooling unit lid, thus simpli-

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Improved Lid-Lifter for Homocarb Cooling Unit

THE PRECISION UNIVERSAL TOOL HEAD



brings all adjustments under absolute micrometric control of the operator without stopping tool or machine. In Jig Borer, Milling Machine or Horizontal Boring Mill, it bores, faces, counterbores, turns outside diameters, mills flat surfaces and slots, under-cuts, recesses, back-faces and does an almost limitless range of "headache" jobs. Send for bulletins. Address all communications, inquiries and orders to

Absolutely Different P. 0. BOX 155, BROOKLYN, NEW YORK Cable Address: "Pretool-New York" Tel: MAin 4-1064

cooling unit expands the capacity of Homocarb furnace equipment, which gives the heat treater "four-factor" control and enables him to carburdze to exact specification.

#### Elastic Anchor Type Stop Nus

A line of anchor type stop nuts for blind-mounting applications on general industrial equipment is now being offered by the Elastic Stop Nut Congaziona Vauxhall Rd., Union, N. J. Besigned to provide vibration-proof fatenings for removable plates used by



GEARS
Good Gears Only
All Kinds
Any Quantity
AT THE RIGHT PRICE
THE CINCINNATI GEAR 00.
1825 Reading Road Cincinnati. Object

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horizontal hus simplieat treater, cturer, this cover hand holes, access and inspection openings, and for other blind-mount attachments, anchor nuts are permanently riveted to the inside of the structure. The bolts, which are inserted from the outside, pass first through the removable plate, then through the structure into the stationary nuts.

Elastic Anchor Type Stop Nuts are available in a wide range of sizes, materials, and thread systems, every nut incorporating the basic Elastic Stop self-locking feature; namely, a fiber locking collar which is an integral part of each nut. This locking fiber is said to prevent the bolt from becoming loose after it is installed in the nut regardless of the severity of the vibration to which it is subjected. In such mountings, bolts may be removed and replaced many times, the anchor nuts retaining their locking ability because of the resilient character of the fiber collar. In addition, the fiber of the collar being softer than the metal of the bolts cannot, it is claimed, damage the threads or their plated surfaces.

As with other Elastic Stop Nuts, when the end of the bolt enters the untreaded collar, its passage is resisted, thus immediately and automatically elim-



Elastic Anchor Type Stop Nuts

inating all play between the threads of bolt and nut and establishing contact of the load-carrying threads under pressure. Further turning and tightening of the bolt impresses a thread in the fiber collar, thereby creating a moisture-tight seal around the bolt and maintaining the thread contact with a resilient grip. The breaking action of the collar itself further serves to prevent any backing out of the bolt.

#### Schultz & Anderson C-66 Radius Dresser

Designated as the C-66, a radius dresser for surface grinding machines

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Cooling Unit

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December, 1941

# SIMPLIFIED INTERNAL GRINDING with the MAJESTIC INTERNAL GRINDER

An exceptionally wide range of internal grinding jobs can be handled on the New Majestic Internal Grinder. Its simplicity of design and ease of operation are features of utmost importance in providing maximum grinding output at low cost.

#### SPECIFICATIONS

Length of table, 48". Swing over table, 10". Travel of cross slide, 2½". Precision dial graduated to .0001". Precision bearing work head. Speeds — 100, 225, 350 r.p.m.

Write for complete details contained .
In New Bulletin

# Majestic Tool & Mfg. Co.

2950 E. Woodbridge

Detroit, Mich.

has been placed on the market by the Schultz & Anderson Co., 174 Ferry St., Newark, N. J. Aside from dressing grinding wheels for different radii, the C-66 can also be used for correctly dressing wheels for radii where a clearance angle on the radius is involved; namely, wheels for grinding turning tools. For this type of dressing operation, the hinge plate of the dresser is set at an angle equal to the clearance angle of the tool. The wheel is then dressed by rotating the diamond back and forth across the face of the wheel through the use of a handwheel located

**GERSTNER Tool Chests** 

1241 COLUMBIA ST.

Aachinists and

Toolmakers, die-

makers and pattern

makers for many years. Made by skilled craftsmen,

and are outstand-

ing values. Choose from Free Catalog.

GERSTNER TOOL CHESTS

at the rear of the dresser.

The ease and quickness with which the C-66 dresser can be set up to dress wheels for radii are brought about by means of a hood which is inserted in

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Schultz & Anderson C-66 Radius Dresser

the arm of the dresser. In dressing a wheel for a 0.250-inch female radius, the hood is elevated to such a position that its underside is 0.250 inch above the center line of the spindle. The hood is then locked in position by a set screw in the arm of the dresser. The diamond is then raised until the nib comes in contact with the underside of the hood and is locked with a set screw. The hood is then removed and the dresser is in readiness to dress the grinding wheel. If there is a clearance angle on the radius, the hinge plate is merely set to the desired angle as mentioned above. To dress the wheel for a male radius, the diamond is set below the center line of the spindle. In all cases, the dressing operation is open and easy to see, thereby making it possible to follow every phase of the operation by eye and thus eliminating guesswork.

Due to the fact that it is frequently





ACCURACY—PROMPT SERVICE

Commercial Centerless Grinding CA 6603 CEDAR AVENUE, CLEVELAND, OHIO

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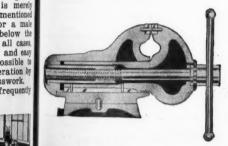
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necessary to dress a wheel for radii of only 90 or exactly 180 deg., for either male or female radii, settings are provided in the hinge plate which can be pushed out to permit only the 90 or 180-deg rotation desired. These settings are held in place by spring action and can be put into or out of use by merely pushing them with one finger. of the

The diamond of the C-66 radius dresser is held in position by pressing it with a set screw against a ground vee in the arm. The vee is an accurately-ground groove of 90-deg. included angle, each side of which is located at an angle of 45 deg. with the end of the arm. By means of this construction, any size diamond up to % inch in diameter can be held accurately in line with both the vertical and horizontal center lines of the spindle. The diamond is also in line with the axial center line of the spindle, the axial center line being parallel with the edge of the dresser base, which is banked against the rail of a magnetic chuck. The spindle bearing is dustproof.

#### Wilton Precision Screw Vise

Marketed by Wilton Tool Corp., Stut-son & Scowley, 180 N. Wacker Drive, Chicago, Ill., the Wilton Precision Screw Vise shown in the accompanying illustration features a hollow cast electro steel head with inside ribbing for addi-



Wilton Precision Screw Vise

tional strength and precision spindle eccentrically guided to relieve pressure at strained points. The movable front is completely enclosed so that no chips can reach spindle and nut.

The Wilton Screw Vise is designed to eliminate vibration, thereby making it ideal for precision work. In addition, the vise has no dead motion or side

ADISON-KIPP ch *pressure* 

IINUM DIE CASTINGS

We are handling orders for millions of die castings, difficult castings and vital parts for nearly all branches of U.S. defense and U.S. aid efforts. (Many of the parts were originated as die castings at Madison-Kipp). The hi-high pressure casting process completely obsoleted older methods of casting Aluminum. When Aluminum again becomes available for non-defense articles, there will be a swing to this "Lighter - Stronger - Cheaper" metal.

AND HIGH SPEED KIPP in TOOLS

Kipp Air Tools give you highest speeds, lowest prices and have proved indispensable in thousands of tool rooms and production departments. Free trial permits any concern with a satisfactory credit rating to try any Kipp Air Tool for ten days. Grinders sell from \$9.75 to \$58.73 Chippers and Filers at \$19.75.

MADISON-KIPP

208 WAUBESA ST., MADISON, WIS

twist, and can be used with or without swivel base. Because of the remoteness of the flange of the sleeve-shaped nut from the thrust head and the short distance from the center of spindle to jaws, the vise is said to have great holding power.

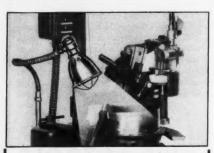
Interchangeable jaws of a special high quality steel with fine surfaced serration are standard equipment of the Wilton Precision Screw Vise. Special jaws of smooth surfaced steel, brass, or copper are available on order.

The vise can be opened to 51/4 inches. Net weight, including swivel base, 37 lb., shipping weight, 40 pounds.



Our production of Barnes Hack Saw Blades and Metal Cutting Band Saws conforms to the standards approved by O.P.M. August 20, 1941.

W. O. BARNES CO., INC., Detroit, Michigan



#### SEE BETTER! Save Working Eyes from Strain

Do away with visual handicaps . . . make work safer . . reduce costly spoilage . . . by VIMCOLIGHTING your machines. The Hall Model AW Valve Seat Grinder (partial view above) is Vimcolight-equipped. This flexible, onthe-spot, high-intensity lighting contributes to industrial production gains. Are your machines Vimcolighted?

## VIMCOLIGHT

VIMCO MANUFACTURING CO.

#### Owatonna Giant Wrenches to Marine Engines

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Facilities for the manufacture of large hexagon, double hexagon (12 point), or



Owatonna Giant Wrenches for Marine Engine

open end striking wrenches for the maintenance of marine steam and Diesel



# "Alnor" Electronic Controller

A simplified type of temperature controller.

No Motors—No Depressor Ban
—No Contacts.

Send for Bulletin No. 3197-A.

Illinois
Testing Laboratories, Inc.
153 W. Hubbard St., Chicage

296 MODERN MACHINE SHOP

December, 1941

engines are now being provided by the Owatonna Tool Co., 357 Cedar St., Owa-Owatonna Tool Co., 357 Cedar St., Owa-mna, Minn. The wrenches are built to special order only in any size required. The illustration shows the size of wrenches now being made for marine steam engines. The largest wrench shown has an 8½-inch opening and is minches long overall.

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8. 3197-A. surgical-type soft rubber and consisting of two barriers, an outer one of metal and an inner one of soft rubber, separated by an air space. The tapered



M. S. A. Ear Defenders

#### M. S. A. Ear Defenders

Fatigue, irritability, and nervous ex-haustion experienced by workers in or about noisy operations are lessened by the use of the M. S. A. Ear Defenders shown herewith, which reduce loud noises by 35 to 45 decibels or to about one-tenth their former loudness, yet are so designed that warning signals and conversation can be easily heard. The resulting effect from the reduction of noise enables workmen to better concentrate on their jobs and thereby increase their efficiency. M. S. A. Ear Defenders are marketed by the Mine Safety Appliances Co., Thomas and Safety Appliances Co., Thomas and Meade Sts., Pittsburgh, Pennsylvania. Essentially, each M. S. A. Ear Defender is a tapered tube molded from

construction is said to permit easy insertion and removal without any danger of coming in contact with the ear drum.

M. S. A. Ear Defenders can be easily cleaned with soap and water, thus en-suring a sanitary article at all times. The ear defenders are supplied packed in an attractive plastic pocket container with spring hinge cover, which keeps them clean when not in use and provides a convenient carrying case.

# WHEEL

We manufacture the only complete line of Grinding Wheel Dressers and cutters and will gladly suggest the proper one for your wheels.

The exclusive solid steel slide makes Vises stronger and more Simplex Vi



Desmond Hex Dresser



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Desmond Diamo-Carbo Dresser, best tool room dresser. Write for catalog M showing complete line of Desmond Dressers and Simplex Vises and name of your nearest dealer.

DESMOND-STEPHAN MFG. CO., URBANA,

Canadian Desmond-Stephan Mfg. Co., Ltd. — Hamilton, Ont.

#### Roto Sight-Feed Lubricator

Designed to operate in any position in the air line, a sight-feed lubricator for air-driven equipment has been developed by the Roto Company, 145 Sussex Ave., Newark, N. J. The unit can be turned to any position convenient for visibility and requirer only a single regulating valve. Oil is added by remov-

ing a simple screw plug at the top.
The Roto Sight-Feed Lubricator can
be installed in an ordinary tee in the
air line. It is made in 4/5 pint and quart sizes and can be regulated to drop as

few as five drops of oil per minute While the lubricator was developed in assure a positive oil feed for the com-

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Roto Sight-Feed Lubricator

FILE YOUR DRILLS

in a Huot Drill Index

Made in 8 sizes. The most usable and efficient drill filing system obtainable.

Ask your dealer or write

HUOT MFG. CO. 500 Robert St. Paul, Minn.

pany's tube cleaners, it may also be used with other types of air-drive equipment.

#### New Books

Practical Lessons in Arc Welding Third edition, seventh printing. By W. J. Chaffee. Published by Hobart Brobers Co., Troy, Ohio. 100 pages, 77 illustrations. Paper cover. Price postpail anywhere, 50c. Special edition in Spanish, \$2.00.

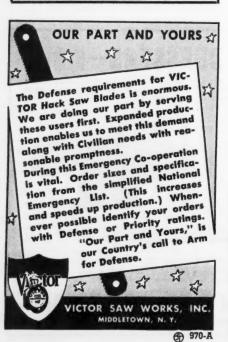
This concise arc welding book, with

#### The BARNES Motor Driven Precision CUTTER GRINDING MACHINE

For Precision Grinding of Formed Milling Cutters used in the manufacture of rifles. pistols, etc.

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ien in easy-to-understand language, offers students, instructors, engineers, and executives an abundance of practical arc welding data and exercises. Patterned after the course of lessons offered in the Hobart Trade School, the book leads the student through all the fundamental stages of arc welding.

Forty-two complete arc welding exercises are covered in the book. The exercises are grouped together in various chapters entitled "Striking and Manipulating the Arc," "Welding with Bare Electrodes," "Welding and Cutting with Gauge Steel." Each chapter contains complete instructions for practicing the various exercises.

Copies of the book may be obtained directly from the company or from anyone of its authorized distributors.

"Molding Technic for Bakelite and Vinylite Plastics." Advances in the art of molding plastics have been so rapid, especially with the introduction of automatic compression and injection molding and numerous other refinements, that the Bakelite Corporation, Unit of Union Carbide & Carbon Corp., 30 E.

42nd St., New York, N. Y., is now publishing a new edition (fourth) of "Molding Technic for Bakelite and Vinylite Plastics." This technical manual has been prepared in collaboration with the Plastics Division of Carbide & Carbon Chemicals Corporation.

The fourth edition of "Molding Technic for Bakelite and Vinylite Plastics" contains 226 pages of factual technical data covering molding practices for both hot-set and cold-set molding plastics. There are 177 photographs and line drawings. Some of the topics covered in the 14 chapters are Principles of Molding; Proper Mold and Product Design; Molding Plant Layout; Heating Media; Weighing, Measuring and Preforming; Finishing Molded Parts; Accessory Equipment and Molding Plant Cost Accounting. One chapter is devoted entirely to conversion tables, mensuration formulas, steam and pressure tables, and other valuable engineering data.

Previous editions have had limited distribution only. Due to the increasing use of molding plastics throughout industry and the many requests received in recent years for copies of this textbook, the publishers have decided to

There's No Operation this Machine
Won't Handle With Only
ONE WORK SET-UP
RAM TY

You can handle every milling, drilling, boring and grinding job—at any angle or compound angle—in horizontal and vertical planes—without changing the work set-up.

Only on a Fray "All-Angle" Milling Machine have you 10 inches of cross travel above the table. The Turret Head is 11½" in diameter, machine calibrated the full 360°.

The Head can be rotated a full 360° in both planes, for any angle or compound angle. The Ram has 10" of in-and-out movement.

Specifications of the FRAY No. 7-B are identical with those of the Fray No. 7, proven by tool-makers all over the world.

FRAY UNIVERSAL MILLING MACHINES

Made by the Manufacturers of Fray Micrometer Offset Boring Heads

FRAY MACHINE TOOL CO.

503 WINDSOR ROAD

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299

offer it for general sale. The price of the regular edition will be \$3.50 and copies can be obtained directly from the Bakelite Corp., Dept. T, 30 E. 42nd St., New York, New York.

Machine Shop Training Course. Second edition. By Franklin D. Jones. Two volumes, 6 x 9 in. Volume 1, 538 pages, 334 illustrations; Volume 2, 552 pages, 209 illustrations. Published by The Industrial Press, 148 Lafayette St., New York, N. Y. Price, complete two-volume

Chicago, III. Morton Salt Co. KERS WHO Sweat NEED Salt **USE MORTON'S SALT TABLETS •** 



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This second edition of Machine Shop Training Course is practically the sam as the first edition with the exception of some additional matter of considerable importance to many students of machine shop practice. This two-volume treatise, which is especially designed for shop courses, technical trade school and also for self-instruction, now has as one extra feature, an original series of blueprint reading charts. The series which consists of 29 full page chart all in color, shows by a simple progressive method just how to read or understand mechanical drawings. Each char includes from two to five drawings especially selected to illustrate, step by step, the fundamental principles under lying blueprint reading. The essential points in each case are explained h text directly opposite each drawing and the drawings and charts are systematically arranged so that the student or apprentice can readily acquire a broad understanding of the principles govening the proper interpretation of mechanical drawings.

The blueprint reading charts are supplemented by a series explaining the meanings of various standard abbreviations or symbols. Typical application of these abbreviations or symbols an illustrated in all cases by means of detail drawings. American Standard screw thread symbols, as well as standard cross section lines for different materials, are included in this series.

Another extra feature of the second edition is a chapter on "Engineering Standards Applied in Machine Building." This chapter features particularly those standards that are of especial importance in the machine shop; name ly, standards relating to parts or elements which are utilized so generally that the adoption of standard forms or sizes is essential. The purpose of this



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chapter is to give the main facts only, or information that will be useful not only in shop work but also in the reading of blueprints or mechanical drawings.

Perman Optical Projector for fast inspecting, measuring, comparing, and checking is illustrated and described in a four-page folder released by the Portman Machine Tool Co., 17 and 19 Beechwood Ave., Mount Vernon, N. Y. Discussed in the folder are the construction, operation, illumination system, work table, opti-

work table, optical system, projection screen,
center stage, and
so on. Specifications are also listed. Copy of folder free upon request.

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Gits Catalog on Lubrication. Of particular use to design engineers is a 172-page catalog on the subject of lubrication which has been issued by the Gits Bros. Mfg. Co., 1846 S. Kilbourn Ave., Chicago, Ill. Special sections of the catalog are devoted to Wick Feed Oiling, Constant Level Oiling, and Multiple Oiling, and there is a comprehensive discussion of the uses and applications of oil seals. In addition, a complete line of oil cups, oil hole covers, oil gages, and sight gravity oilers is featured by full-size illustrations.

The catalog, which contains over a thousand illustrations, is available free to angineers, purchasing agents, and others interested in the selection and purchase of lubricating devices who will address a request on their company letterheads.

Niagara Power Squaring Shear Bulletin 71-H. Niagara Machine & Tool Works, 637-697 Northland Ave., Buffalo, N. Y., is now issuing a 20-page bulletin containing illustrated, descriptive, and tabular information on Niagara Series "100," "200," and "0" Power Squaring Shears. Copy free upon request.



#### Dimensional Control Theory and Industrial Applications

The Sheffield Gage Corp., Dayton, Ohio, has prepared a portfolio of 40 educational gage charts for use in college, university, vocational, and defense training classrooms. Accompanying the portfolio is a detailed lecture on industrial gaging.

The charts, which are entitled "Dimensional Control, Theory and Industrial Applications, are designed for the student and give an overall picture of precision gaging in modern industry. Included in the charts are numerous basic definitions covering such topics as di-mension, tolerance, limits, clearance, and interference. The charts also include illustrations of different types of gages; an ex-planation of unilateral and

bilateral tolerances; tables of fits and tolerances; micrometer readings



Sheffield Portfolio of Educational Gage Charts

thickness, showing chance variation in reading; various applications of gage, and an explanation of selective assembly and interchangeability.

A limited number of these charts an being distributed to educational institutions.

Weltronic Control Bulletin No. 8-41. A four-page bulletin illustrating and & scribing heat controls, synchronized and synchronous timers, complete many chine controls, and synchronous # quence timers is now being published by the Weltronic Corp., 3080 E. Oule Drive, Detroit, Mich. Copy of Bullett No. S-41 free upon request.





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(2), 620 N. Mechanic St., Jackson,
lich., is the subject of an illustrated
and descriptive four-page bulletin, desgrated as the No. RP-1, now being published by this firm. The bulletin, which
heldes complete specifications, is availble free upon request.

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"Why Farval?" is the title of an eight-page, 8½ x 11-inch, three-color bulletin now being published by The Farval Corp., 3293 E. 80th St., Cleveland, Ohlo, describing in minute detail the Farval Centralized System of Lubrication. Beginning with a crisp comment on correct lubrication as a prime element in maintaining high production schedules, the bulletin discusses the simplicity of the Farval system, illustrates in component parts, and charts the 12 distinct savings effected by the Farval system.

In the center spread, a series of cross sections shows the progressive movements within the Farval Dualine measuring valve as it delivers oil or grease under pressure to each individual bearing. Copy of bulletin free upon request.

# SPEED with SAFETY on MACHINE REPAIRS

#### USE OTC TOOLS

5 TO 50 TONS

The easy, safe, quick way to remove and replace wheels, gears, bearings, shafts, sleeves, pulleys, etc.

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have a patented grip which prevents slipping, avoids damage to costly parts, reduces accidents. Designed to facilitate working in close quarters.

SPECIAL PULLERS and other industrial tools designed and built for special

needs.



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DETROIT, MICH.

Long established manufacturer of medium and heavy precision machinery is in the market for patented or patentable ideas or inventions requiring development for production and marketing. Want items applicable to the defense program or suitable for industrial use after the emergency. Both machinery and other products lending themselves to small volume production will be considered. Send complete details on protected ideas to Modern Machine Shop, Dept. 17, 431 Main St., Cin'ti, O.

"Tooling Turret Lathes for Small La Production with Kennametal Steel-Cat ting Carbide Tools" is the subject of four-page illustrated bulletin now being distributed by McKenna Metals Co., 3 Lloyd Ave., Latrobe, Pa. Copy of Bulle tiun No. 141 free upon request.

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Tungsten Carbide Standard Tool Bul Tungsten Carbide Tool Co., 717 E. McNichols Rd., Detroit, Mich., has released a four-page bulletin covering its line of standard cutting tools. Com plete specifications for 92 different type and sizes of carbide tools are given, a well as prices. Both steel-cutting and cast iron and non-ferrous cutting to grades are covered, with tips available of any of the following materials: Vas-

coloy, Carboloy, Kennametal, or Firthite. Copy of bulletin free upon request

Scherr Ultra-Chex Folder. An eightpage folder on the uses of gage blocks and optical flats has been published by the George Scherr Co., 130 Lafayette St., New York, N. Y., as part of its program to disseminate precision measuring information to assist in defense production.

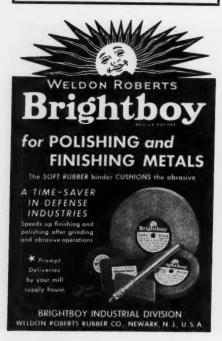
The folder devotes two full pages to the uses of optical parallels and flats showing actual charts in five colors and giving a simplified explanation of the light wave interference theory. In addition, the folder contains a number of photographs showing gage blocks in use to set adjustable limit snap gages, sine bars, checking micrometers, and so on There is also a chart showing different ways in which gage blocks may also be used, not in inspection, but in set-ting up machine tools, and so on, to increase production accuracy. Copy of folder free upon request.



### CARBIDE TOOL Requirements

Send for new reduced prices today.

The Carbide Tool Engineering Company 4439 LINCOLN AVE. CHICAGO, ILL.





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December, 1941

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Vickers Flow Control and Overload Relief Valves with automatic pressure compensator and overload pressure relief adjustment for accurate oil hydraulic volume control is the subject of a four-page technical bulletin announced by Vickers, Inc., 1400 Oakman Blvd., Detroit, Mich. Copy free upon request.

"Five Keys to Welding Wisdom" is the title of an eight-page booklet now being distributed by The Lincoln Electric Co., Cleveland, Ohio, containing descriptive information on five books comprising a complete library on all phases of arc welding. The books are entitled "Procedure Handbook of Arc Welding Design and Practice," "Lessons in Arc Welding," "Simple Blueprint Reading," "Welding Metallurgy," and "Arc Welding in Design, Manufacture and Construction." Order blanks are included in the booklet, copy of which is available free upon request.

Burroughs - Kahn Diecaster. The Burroughs - Kahn Co., 1239 South Bend, Ind., has prepared a fourpage illustrated and descriptive folder on the Burroughs-Kahn Diecaster for rapid production of high quality zinc base die castings. Copy free upon request.

De-Sta-Co Toggle Clamps, for clamping parts in production a r e profusely illustrated and described in an eight-page bulletin now being issued by the Detroit Stamping Co., 349 Midland Ave., Detroit, Mich. The bulletin, which is designated as the No. 41, also illustrates and describes De-Sta-Co "C" Clamps with quick - acting toggle movement and De-Sta-Co Toggle Plier. Copy free upon request.



December, 1941

MODERN MACHINE SHOP

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## Post "Giant" Decimal Equivalent Wall Chart

A "Giant" Decimal Equivalent Wall Chart for draftsmen, engineers, and architects is now being offered by The Frederick Post Co., 3650 N. Avondale Ave., Chicago, Ill. The chart is 26 x 39 inches in size and is printed in large, heavy type 1½ inches high, which, it is claimed, can be easily read 50 feet away. In addition, chart is printed in two colors, red and black on a white background, thereby making it attrac-

s The Widely Used EXIBLE OUPLING LUBRICATION. NO SERVICING. TROUBLE-FREE. 3/16" to 21/4" misalignment. Saving of \$\$\$ and delays. No lubrication—no servicing. LOW COST. Send for catalog. LOVEJOY FLEXIBLE COUPLING CO. 5007 W. Lake St. Chicago, III.





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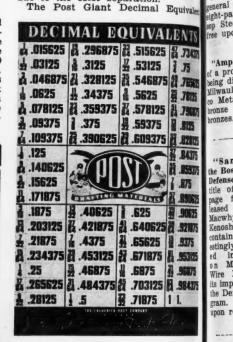
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Post "Giant" Decimal Equivalent Wall Chart

Wall Chart, which brings all the equivalents from of to \$2 within easy reading of the eyes, is available from the company upon receipt of a request addressed on a company letterhead.



Jessop "Lion" Carbon Tool Steel for general tool purposes is covered in an eight-page leaflet announced by the Jessop Steel Co., Washington, Pa. Copy free upon request.

"Ampco Expands Again" is the title of a profusely illustrated mailpiece now being distributed by Ampco Metal, Inc., lillwaukee, Wis., manufacturer of Ampco Metal, an alloy of the aluminum ronze class, and Ampcoloy industrial bronzes. Copy free upon request.

Sundstrand General Catalog G.C.1. The Sundstrand Machine Tool Co., Rockford, Ill., is now issuing a 16-page catalog containing illustrated and descriptive information together with principal specifications of its line of machine tools and auxiliary equipment. The catalog covers various types of milling machines, single spindle automatic lathes, and special machines, as well as centering machines, balancing tools, bench centers, index bases, and so on. Copy of Catalog G.C.1 free upon request.

Tell us your pump needs.

"Sandy and the Boss Discuss Defense" is the title of a four-page folder released by the Macwhyte Co., Kenosha, Wis., containing interestingly-presented information on Macwhyte Wire Rope and its importance in the Defense Program. Copy free upon request.

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Acro Die Cradle. Descriptive literature on the Acro Die Cradle. a universal parallel unit to be used for the level support of various size dies, jigs, and metal parts to ensure correct alignment while drilling, counterboring, tapping, milling, or grind-ing in the diemaking room or during machine shop operations, is now available from the Acro Tool & Die Works, 2829 Montrose Ave., Chicago, Ill., free upon re-

# In Extending Production -Depend on Brown & Sharpe MOTOR DRIVEN PUMPS

**Geared and Centrifugal** 

BROWN & SHARPE MFG. CO.

BS Providence, R. I., U. S. A.

BROWN & SHARPE PUMPS

"Now is the Time to Standardize with Johnson General Purpose Bronze Bearings" is the title of a four-page folder released by the Johnson Bronze Co., 590 S. Mill St., New Castle, Pa. Copy free upon request.

Roan Cutter and Tool Grinder. The Roan Mfg. Co., 1220 Washington Ave., Racine, Wis., is now offering a bulletin describing its universal tool and cutter grinder for use in grinding and sharpening all types of metalworking tools, as well as for contour and surface grinding. Copy free upon request.

THE PURE OIL CO.

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A Complete Line of INDUSTRIAL

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Capewell Metal-Cutting Saw Blain Catalog No. M249D showing the line of Capewell Metal-Cutting Saws as recommended by the OPM on August 20th in now being distributed by The Capewell Mfg. Co., Hartford, Conn. Page 7, 8, 9, and 10 contain useful information for the user of hack saw blades and pages 12 and 13 have information for the user of band saw blades. Confere upon request.

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"The Simmons Way of Engineers Machine Tool Rebuilding" is the tilt of a 58-page, attractively printed, platic bound catalog now being published by the Simmons Machine Tool Cop., 1745 N. Broadway, Albany, N. Y.

In the preface, the catalog discusses

In the preface, the catalog discusses the development of Simmons Engineered Machine Tool Rebuilding, some of the types of machines that are rebuilt and just what is done in rebuilding them, some of the plants, factories, and so on, regularly receiving machine tools rebuilt in the Simmons plants, and so on. In the pages following the preface. "The Simmons Way" is photographically presented by means of candidamera glimpses of the company—its plants, Engineered Rebuilding methods, and personnel and management.

Starting on page 39 is a section containing illustrated, descriptive, and tabular information on the Simmons 48 and 54-Inch Heavy Duty Engine Lathe, No. 2 Turret Lathe, Selector Dial Control Milling Machine, 16 and 18-Inch Standard Lathe, 18 and 20-Inch Heavy Duty Lathe, 16/25-Inch and 18/27-Inch Gap Bed Lathe, 22/34-Inch Gap Bed Lathe, and 20/40-Inch and 28/50-Inch Sliding Bed Gap Lathe.

Copy of the catalog can be obtained by any mechanical executive addressing a request on his company letterhead.



December, 1941

aw Blade Portman All-Purpose Milling Machine. the line of A six-page folder containing construcs as recomtion details, features, specifications, ilgust 20th i lustrations, and so on, of the Portman All-Purpose Milling Machine is now be-The Cape nn. Page ing issued by the Portman Machine ul informa-Tool Co., 17 and 19 Beechwood Ave., Mount Vernon, N. Y. Copy free upon saw blade nformation request. des. Copy

Precision Surface Plates, Angles, and Cubes as well as wheels, handles, and knobs are treated in a four-page folder issued by Machine Products Corp., 6773

E. McNichols Rd., Detroit, Mich. The folder contains illustrations of all the items along with mechanical drawings, sizes, and prices. Copy free upon request.

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"Grits and Grinds" Vol. 32 No. 10 has its lead article on proper grinding wheel storage and supervision. Following this article is a brief item illustrating and describing a direct indicating table stop for use on Norton Cylindrical or Universal Grinder for shoulder gaging and location; an interesting article entitled "Important Factors in Testing Trial Wheels, and another brief item describing and illustrating a fine cross feed with adjustable stops applied to Norton 10 - inch Surface Grinder for use in slot grinding.

Copy of "Grits and Grinds" Vol. 32 No. 10 is available from the Norton Company, Worcester, Mass., free upon request.

University of Iowa Extension Bulletin No. 518. This four-page bulletin describes the University of Iowa's Industrial Engineering Film Library and contains a list of motion and time study films available for loan. Copy of the bulletin can be obtained by writing to the Department of Visual Instruction, University of Iowa, Iowa City, Iowa.



# CATALOG LIBRARY

To obtain copies of the catalogs listed here, indicate on the coupon the number of the item in which you are interested and mail as directed.

### 1. Stock Gears

Bond stock gears, sprockets, speed reducers and industrial equipment are detailed in 184 pages of catalog No. 59. Charles Bond Co., 617 Arch St., Philadelphia, Pennsylvania.

### 2. Sintered Carbide Cutting Tools

Handbook containing 64 pages of data telling how to make, use and maintain Firthite sintered carbide cutting tools is available from Firth-Sterling Steel Company, McKeesport, Pennsylvania.

### 3. Toggle Clamps

Detroit Stamping Co., 349 Midland Ave., Detroit, Mich., has issued Bulletin No. 41, illustrating and describing De-Sta-Co toggle clamps for clamping parts in production.

### 4. Abrasive Cut-Off Machines

Folder illustrating and describing three models of abrasive cut-off machines is available from The Minute-Man Machine Co., Cincinnati, Ohio.

### 5. Drill Vises

Johnson Tool Co., East Providence, R. I., has available folder illustrating and describing the Johnson 3way drill vise.

### 6. T-Slot Clamps

Folder detailing Advance T-Slot clamps, manufactured in standard and heavy duty types, may be obtained from Advance Machine Works, 3727 Weisser Park, Fort Wayne, Indiana.

### 7. Portable Coolant Pump

The new portable, controlled flow coolant pump manufactured by Gray-Mills Co., 217 W. Ontario St., Chicago, Ill., is detailed in new folder issued by this company.

### 8. Arc Welders and Accessories

Hobart arc welders and accessories are detailed in new 38-page catalog issued by Hobart Bros. Co., Troj. Ohio.

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### 9. Turret Punches

Information on Wiedemann turned punches ranging from hand operated types to 80 ton power units for speeding up short run piercing operations, is available from Wiedemann Machine Co., 1831 Sedgley Ave., Philadelphia, Pennsylvania.

### 10. Inspection Instruments for Internal Surfaces

"Precision Instruments for the Exacting Inspection of Internal Surfaces" is the title of 12-page catalog issued by American Cystoscope Makers, Inc., 1241 Lafayette Ave. New York, New York.

# 11. Internal Threading, Boring and Facing Tools

Comet Tools, Inc., 738 Broadwa, New York, N. Y., has issued folds containing illustrations, descriptions and prices of Comet internal threading, boring and facing tools.

### 12. Semi-Automatic Tapping Fixtures

A new illustrated bulletin has been issued by R. G. Haskins Co., 617 & California Ave., Chicago, Ill., covering Haskins semi-automatic tapping fix tures.

### 13. Metal Cutting Tools

New 192-page illustrated catalog No. 17, featuring metal cutting tools. has been released by Midwest Tool & Mfg. Co., Detroit, Michigan.

Milling Machine

Jefferson Machine Co., 750 W. Fourth St., Cincinnati, Ohio, has issued new circular featuring the "Bull Dog" milling machine.

Graduating Machine

Machine for graduating circular feed dials for lathes, milling machines, grinders and other machine tools is illustrated and described in folder issued by The Greaves Ma-chine Tool Co., Cincinnati, Ohio.

6. Cutter Grinder

Circular illustrating and describing the Barnes precision cutter grinder is available from General Machinery Corp., 140 Federal St., Boston, Massachusetts.

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"The Portman All-Purpose Milling Machine" is the title of a new folder issued by Portman Machine Tool Co., 17 Beechwood Ave., Mt. Vernon, New York.

Adjustable Hollow Mills

Genesee Manufacturing Co., Inc., 141 N. Water St., Rochester, N. Y., has issued new catalog illustrating and describing Genesee adjustable hollow mills, spot facers, and production tools.

3. Thread Grinding Handbook A new 24-page handbook on thread grinding has been issued by the Norton Company, Worcester, Mass.

20. Tool Chests

New bulletin featuring tool chests for machinists and toolmakers has been issued by H. Gerstner & Sons, 1241 Columbia St., Dayton, Ohio.

21. Tool and Cutter Grinder

McDonough Mfg. Co., Eau Claire, Wis., has issued bulletin giving all data on the Sterling Universal Tool and Cutter Grinder.

22. Radius Dresser

Bulletin detailing Radius Dresser for Surface Grinders is available from Schultz & Anderson Co., 174 Ferry St., Newark, New Jersey.

23. Nut Slotter

The Pellow Machine Co., 13502 Foley Ave., Detroit, Mich., has available descriptive folder detailing the Pellow double conveyor nut slotter.

24. Machinery Oils and Greases

"Exploring the Utility of a Genuine Development in Industrial Lubrication" is the title of an interesting and helpful 24-page booklet released by D. A. Stuart Oil Co., Chicago, Illinois.

25. Surface Plates, Angles, Cubes Machine Products Corp., 6773 E. McNichols Rd., Detroit, Mich., has issued new folder giving complete information and prices on surface plates, angles, cubes manufactured by this company.

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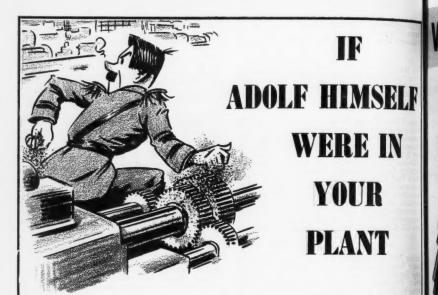
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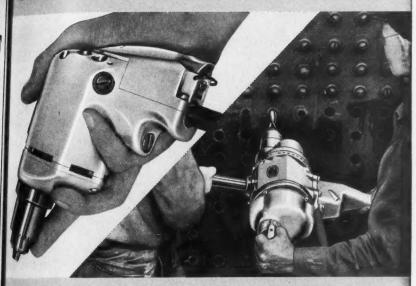
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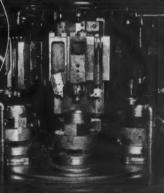
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Timken-Detroit Axle Company has had considerable experience with machining tough steel parts, and has conclusively demonstrated to their own satisfaction the increased production, longer tool life, and the more pieces per grind possible by using the proper grade and style of tools.

Our engineering and research departments can be of great help in getting you started right on similar increased production possibilities. We are glad to cooperate with you toward the most efficient utilization of these tools.

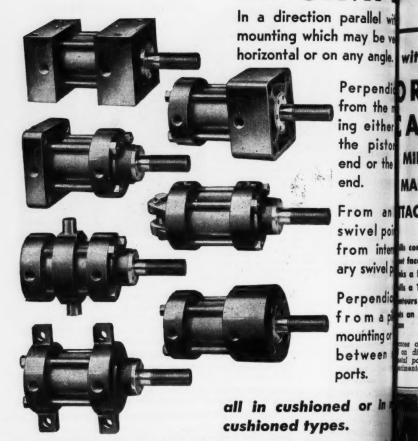
# VASCOLOY-RAMET CORPORATION

NORTH CHICAGO, ILLINOIS

AUTHORIZED AGENTS IN PRINCIPAL CITIES In Conedo: Carbide Tool & Die Company, Ltd., Hamilton, Ont.

ESUPERIOR TANTALUM-TUNGSTEN CARBIDE TOOLS

# POWER MOVEMEN applied CONVENIENT IS and SIMP



It will aid in more prompt deliveries, if these standard designs are use. can be furnished with the least amount of personal attention, required delaying special material requisitions or manufacturing provisions to necessary for special designs.

Hydraulic Cylinders are shown. These are described in our Catalog Similar designs are available for compressed air use.

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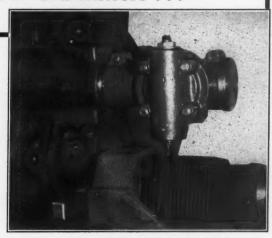
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ils compound angles m inter it faces on a bevel swive p a horizontal keyway rpendid tours radii or angles

> of other operations reon dies, fixtures, templates wal patterns. Equally handy minental and production work.

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## The Cutter Spindle is Adjustable to ANY ANGLE in ANY PLANE

Now-in only three minutes time-you can convert your old standard miller into a highly adaptable, high-production miller - even if your millers are so old that you consider them almost obsolete.

Porter-Cable's many-purpose Miller Attachments can be fitted either to hand or powerfeed millers. They'll do all those awkward milling operations which are always coming up in any tool room, job shop or manufacturing plant...jobs that take an excessive amount of time on standard millers.

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**Precision Tool Builders Since 1906** 300-12 WOLF ST. SYRACUSE, N. Y UFKIN RADIUS GAG



# EASY TO USE . FIVE APPLICATIONS

Because each blade in the Lufkin Set of Radius Gages is a separate unit, it can more easily and accurately be applied to the work. It has five separate applications of its individual radius and carries the corresponding external and internationals. The Lufkin Gage Holder (supplied for slight additional cost) is ideal for hard-to-get-at places.

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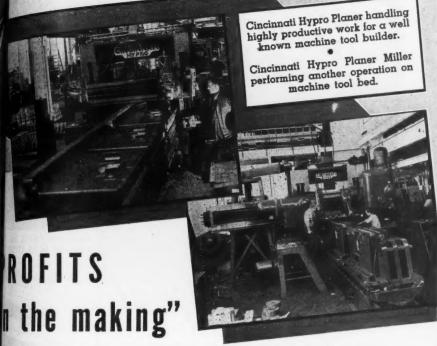
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# MAKING BETTER MACHINE TOOLS with better machine tools



These two Cincinnati Hypros are twork in the shops of one of the ading machine tool builders, seeding production and assuring holits in the Making."

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In many other plants, busily enged in handling rush work at top seed, Cincinnati Hypro Planers, wing Mills and Planer Millers are aying an important part in keepg production flowing smoothly ad cutting costs.

Every Hypro is a high production

machine, modern, fast, convenient in operation, adaptable and rigidly constructed for severe, exacting work.

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FALK CORP. SAYS "HERE'S HOW".

When Falk Corporation, Milwaukee, needs specially shaped carbide tools fast—it's a matter of minutes—and the job is done!

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STANDARD TOOLS ARE AVAILABLE IN 10 STYLES

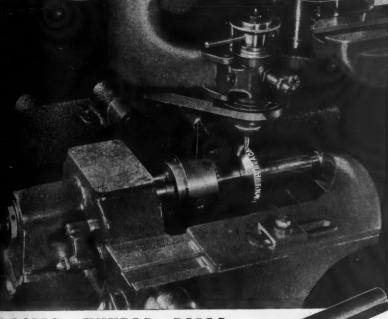
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(T-11, L. H.)

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Science, research and inventive genius are accelerated and stimulated under the pressure of war. Without digging my deeper, we must admit the truth of this phenomenon as, perhaps, the only economic good that ever comes of international conflict.

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Like other Geometrics, this tool is hardened and ground throughout, built to close limits, carefully tested and inspected. The Style DS Die Head will cut smooth, accurate screw threads on your work—and save you money. May we send you our booklet?

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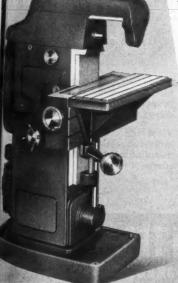
# PORTMAN All-Purpose MILLING MACHINE

By removing entire right angle work table, unusually large work or bulky fixtures can be mounted on 32" x 101/2" vertical table. Unique design of saddle and pivot mounting of table elevating screw housing permits work which extends down to base of machine to be clamped directly to front of carriage table. There is no obstruction in 46" depth from spindle nose to base of machine.

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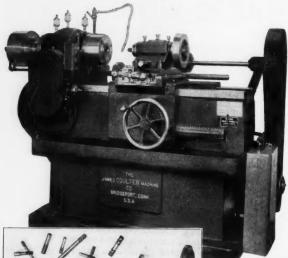
8 spindle speeds range from 90 to 1760 r.p.m. Table feeds, independent of spindle speed, are from 34" to  $14\frac{1}{2}$ " per minute.

Write for complete details of this truly "all-purpose" milling machine.



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Any parts that can be held in an chucks, air operated chucks, air operated chucks, air operated chucks, or special face plate in ... can be threaded on this machine.

Set cam-controlled automatic cycle as piece. Thereafter, cutter feeds into mo proper depth and at correct pitch and draws when cut is completed.

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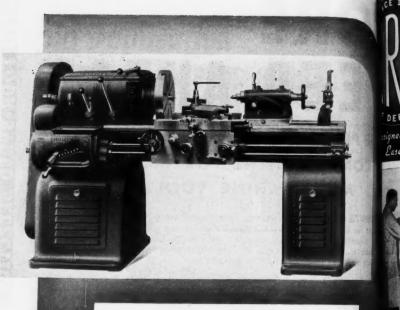
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## **New Geared Head Lathes**

12 speeds—16 to 400 r.p.m. (Higher ranges can be furnished.)
Timken Bearings or Taper Bronze Bearings on high carbon steel
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Hardened alloy steel shaved gears running in oil.

Vee belt drive from constant speed reversible standard Nema frame motor mounted in cabinet leg under headstock.

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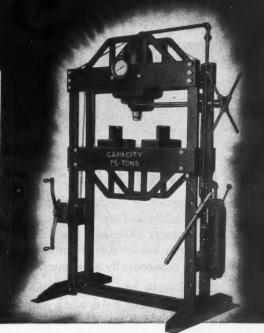
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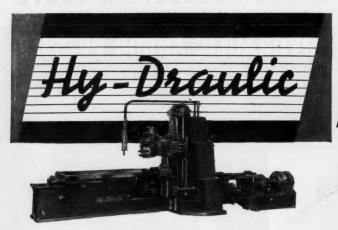


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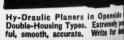


Duty Sizes.





Hy-Draulic Slotter. Rating; 36' Maxis

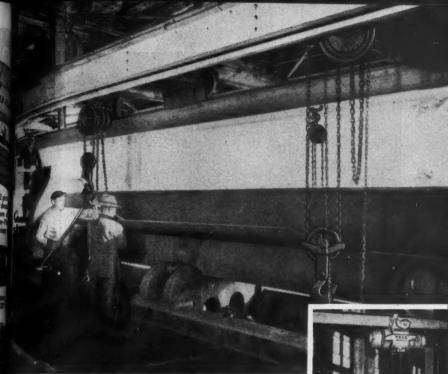




Shapers .. Planers .. Slotters .. Shaper-Planers ROCKFORD MACHINE

MODERN MACHINE SHOP

December, 19



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Get in touch with your nearest Yale distributor today. Let him show you Yale Hoists can increase the efficiency of your hoisting operations.

Geared Hand Chain Hoists Capacities: 300 lbs. to 40 tons. Electric Hoist Capa-1 1/4 to 10 tons. Portable "Pul-Lift" Hoist Capacities: 3/4, 11/2, 3, 41/2 and 6 tons.

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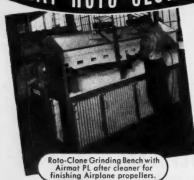
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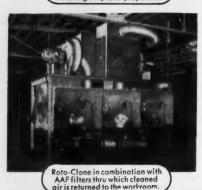
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# AAF ROTO-CLONES FOR NATIONAL DEFENS





Roto-Clones like those assembled abon shipment to new industrial buildings and dries, give some idea of the important that dust control plays in National Defense plants where tanks, planes, trucks, gus shells—in fact wherever the countless distribution are made—clean air plays a vital in keeping production lines moving at upper dented speed.

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American Air is proud of the part it is tall in the National Defense effort—AAF air fittin and dust control equipment delivered manufacturing plants directly engaged in ming war materials comprises approximately 10 of our output.

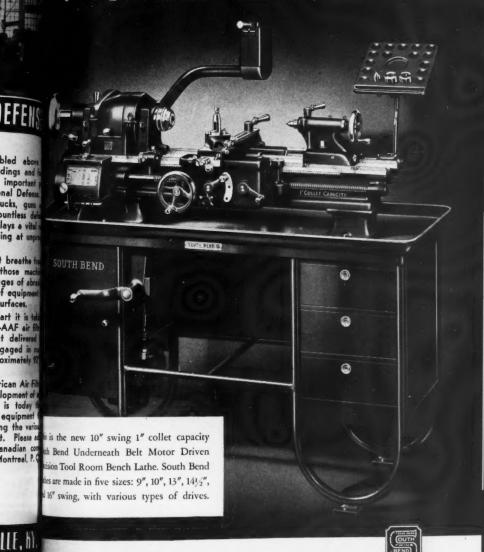
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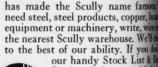
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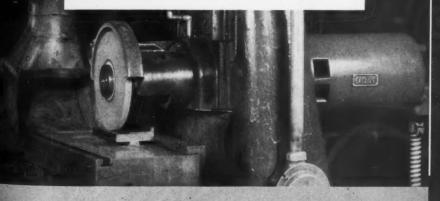
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QUIPPED with Ex-Cell-O's precision ball bearing spindle, your grinder will give you superior performance in production, finish, and wheel life. The Ex-Cell-O spindle, with its specially designed bearings, assures minimum end and radial play, does not generate excessive heat, and stands up for exceptionally long periods of time without bearing adjustment or replacement. Send to Ex-Cell-O today for Bulletin S-537. It gives much practical data on grinding machines using Ex-Cell-O spindles as standard or replacement equipment.

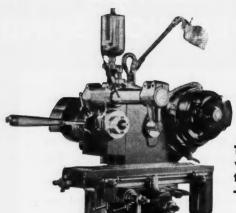
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Precision AND TOOLS

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The NICHOLS Hand Mille was designed for production milling of small part — at low cost.

The Defense Program demand speed.

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Why not get full details on how to speed up YOUR small part milling? Write for catalog TODAY.

Longitudinal Feed, 10". Transverse Feed, 7". Vertical Feed of Knee, 13½". Vertical Movement of Head, 4½". Micrometer dials on Transverse and Vertical Feeds. Spindle Speeds:—100, 200, 600 and 1200 r.p.m.

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buckeye cored and solid 13" bars, with machined side diameters and machined and centered ends, ideal for maintenance work. Buyers save approxiely 25% of purchased weight as compared to rough , and avoid making the hard outside cut. Set-up universal chuck can be accomplished quickly. The are easily machined to finished size and can be cut standard bearing lengths with a minimum of waste. ical Buckeye quality throughout—free of blow s. Prompt shipment of the most popular sizes stock. Write for prices and full details.

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13" rough bars in a widerange of sizes, 851 sizes of readyto-use finished bushings, 160 sizes of ready-to-use electric motor bushings-carried in all warehouse stocks ... also special bearings in an infinite variety of shapes, sizes, and bearing metal analyses to meet any specification.

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December

CLEVELAND, OHIO

# GENESE



### PRODUCTION TOOLS 4 x 4 x 4!

Multiple blades ...
Multiply production.
Four blades will do four times the work four times as fast.

Multiple operations with multiple tools. Genesee hollow mills can be fitted with drills, reamers, pilots, etc., for multiple operations.





High speed steel blades are easily remove sharpening — can be replaced at nominal Blades are easily and accurately adjusted to .001". Ten standard styles. Special tools by order.

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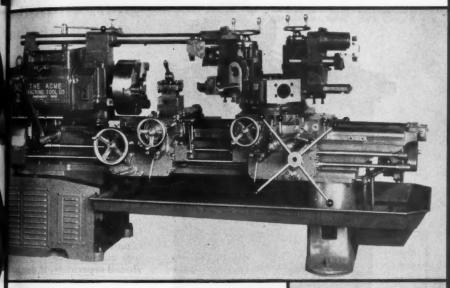
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a turret lathe designed to take heavier cuts at faster with cemented carbide cutting tools. The new heavy wet tools supported by 3" diameter stationary overhead ware designed to furnish maximum rigidity and accuracy.

Turning Head-With reversible cutter holders availthe Multiple Turning Head, the turning range of all overlap each other.

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December ACME MACHINE TOOL CO. OHIO





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#### New Convenie Drill Grindin Combination

#### Sellers No. 16 Drill Grinder with steel cabb pedestal

A new convenience for on tors engaged in drill grinds the steel cabinet pedestal a furnished with the Sellers in IG Drill Grinder. It form firm, substantial pedestal the grinder and the work, as handy cabinet in which to a supplies and attachments (in inet and grinder may be p chased separately, if desired.

The Sellers Model 1G Drill Grinder will grind drills from No. 70 (.028") to ½" and produces accurate drill points of 160 to 65 degrees included angle—perfect drill points with equal identical lips. Speeds production. Saves skilled labor for production machine work. Saves drills. Write for catalog and prices.

The cabinet has a working space 13" wide by 30" long and stands 31" from the floor. It is of heavy sheet steel, rigidly constructed and braced to form a vibration-less mount for the grinder. There are three shelves of wood (to avoid defacting tools) with a hinged door and fastener. Finish is standard machine tool gray. Weight 175 lbs.

WM. SELLERS & CO., INC. . 1614 Hamilton St., PHILADELPHIA, PA.



Sellers

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For the Air
That Clamps these
Jaws of Steel..

Modern pipe threading and cutting-off machine manufactured by the Landis

so of the modern threadand cutting-off machine
ahere is to "put the bite"
hily diet of cold metal
anaturally, every part of
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son why American Flextul Hose was chosen for
assignment on the maharallel lengths of Amercible Steel Tubing carry
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to the cutting surface.

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December,

tases, the "garden hose" of American Metal an important reason the doing as well as its abilists deteriorating effects all. Because its all-metal moinrules out "oil rot," an Flexible Metal Hose than measures up to the

#### Defense has drafted American Metal Hose and Tubing

... for lines on modern machine tools and for flexible connectors on all types of machinery now working overtime for national defense. Despite expanding plant facilities, it will not be possible for us to meet all civilian requirements. But American will continue to serve in old duties—and when peacetime requirements are again "first," American will still lead in the flexible connector field.

Write for Bulletin No. 40 illustrated below. It contains complete information on "A merican Seamless"—its properties, available forms, typical uses and methods of application.

41270-A

Machine Co. Waynesboro, Pa.



### American Metal Hose

American Metal Hose Branch of The American Brass Company General Offices: Waterbury, Connecticut

ANACONDA

General Offices: Waterbury, Connecticut Subsidiary of Anaconda Copper Mining Company In Canada: Anaconda American Brass Ltd., New Toronto, Ont.

# GUARD PRODUCTION'S LIFELINE, TOO!

By Increasing Tool Life; By More Accurate Recommendationing of Your Cutting Tools; By
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There is a real opportunity for savings in your tool reconditioning departments. If you will eliminate those obsolete methods and machines and install Modern Oilver Tool Conditioners you can Conserve those "hard-to-get" cutters and tools, grind them in less time and keep them on the job longer.

Now is the time to investigate the savings possible with the ACE Universal Grinder, the 510 Drill Grinder, the ARC Grinder for Radius work.

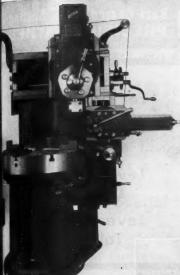
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Automatic Twist Drill Grinders, Face Mill Grinders, Tool and Cutter Grinder Point Thinners, Die Making Machines, Template Tool Bit Grinders

OLIVER INSTRUMENT COMPAN 1430 EAST MAUMEE STREET ... ADRIAN, MICHIGA



ROGERS 36" VERTICAL **TURRET MACHINE** 

**EFFICIENT** ECONOMICAL POWER RAPID TRAVERSE

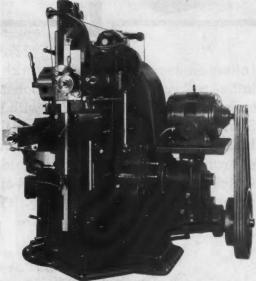
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SPEED RECISION MITTY RANGE

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Manufactured By: NGERS MACHINE WORKS ALFRED, N. Y.



(Rear View)

Distributors

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Buffalo, N. Y.

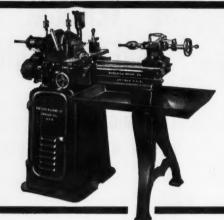
ter Grinder

Grinders

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### SHELDON Back Geared Screw Cutting PRECISION LATHES



For production: Lever Operated Double Tool Po Lever Operated Collet Attachm Lever Operated Tailstock

For many production (often on second operation work) these moderate prin lathes will surpass in output much more expensive mach NOPAK tools. Costing less than \$775 (with motor included) the Sheldon Manufacturing Lathe (illustrated) comes w Hand Lever Collet Attachment (Collet capacity 3/4"), Let operated Double Tool Slide, Hand Lever Tailstock, San Quick Change Gear Box. With 4-speed underneath mo drive enclosed in pedestal leg. It's a complete operation unit that can be set up anywhere.

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Model D NOPAK Air Cylinder

but this one illustrates how NOPAK Valves and Cylinders may be used to meet urgent demands for Special Production Tools

A "dust explosion" hazard in a certain plant made it ecessary to develop a battery of screw drivers with park-free motors and friction-free mechanisms. Air owered, air controlled, screw drivers solved the probem quickly, economically, efficiently! Though specially built, these machines were made

Incident in the plane of the pl actionic

Here, then, is a new tool, developed with a minimum /4"), Let of new patterns, new castings, new stampings — without

ock, Sel mustly delays for special proeath mot HOPAK Valves and Cylinders may help you lick a defense operati bottleneck" in your plant

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NOPAK 3- and 4-Way Foot Operated Air Control Valve



VALVES and CYLINDERS

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# RAGINE

#### METAL CUTTING MACHINES

RACINE Metal Cutting Machines nine abreast in battery formation above are cutting oval tool steel stock four pieces at a time, day in and day out. Such production cutting with close accuracy and minimum blade wear make this Cut-Off Department an economical unit in this manufacturer's production story.

Competition is keen in this field and costs are of prime consideration. Their high cost material must be cut quickly, accurately, and at an acute angle with a minimum of waste. With RACINE Shear Cut progressive sprays they need again this open

progressive screw feed saws they needed no guess work in figuring their costs on this open each cut is made in exactly the same length of time — guaranteeing production. Unline racy—low blade cost—guaranteed production is Controlled Cutting and Low Cost of Open racy—low blade cost—guaranteed production is Controlled Cutting and Low Cost of Open racy—low blade cost—guaranteed production is Controlled Cutting and Low Cost of Open racy—low blade cost—guaranteed production is Controlled Cutting and Low Cost of Open racy—low blade cost—guaranteed production is Controlled Cutting and Low Cost of Open racy—low blade cost—guaranteed production is Controlled Cutting and Low Cost of Open racy—low blade cost—guaranteed production is Controlled Cutting and Low Cost of Open racy—low blade cost—guaranteed production is Controlled Cutting and Low Cost of Open racy—low blade cost—guaranteed production is Controlled Cutting and Low Cost of Open racy—low blade cost—guaranteed production is Controlled Cutting and Low Cost of Open racy—low blade cost—guaranteed production is Controlled Cutting and Low Cost of Open racy—low blade cost—guaranteed production is Controlled Cutting and Low Cost of Open racy—low blade cost—guaranteed production is Controlled Cutting and Low Cost of Open racy—low blade cost—guaranteed production is Controlled Cutting and Low Cost of Open racy—guaranteed production is Controlled Cutting and Low Cost of Open racy—guaranteed production is Controlled Cutting and Cost of Open racy—guaranteed production is Controlled Cutting and Cost of Open racy—guaranteed production is Controlled Cutting and Cost of Open racy—guaranteed production is Controlled Cutting and Cost of Open racy—guaranteed production is Controlled Cutting and Cost of Cost

In RACINE'S line of metal cutting machines there is a saw for every size and pure 6 x 6 to 14 x 20, hydraulic and mechanical types—standard and fully automatic saws. If will be glad to furnish free metal cutting information applying to your particular metal upon request. Write!

RACINE TOOL & MACHINE OF

# **OPERATION**



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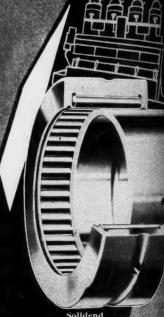
No Valve Tappet Guides



A Four-Spindle Conomatic produced 38 of these airplane valve tappet guides per hour over a period of 11,000 hours. During this period the machine was down only 12.7 hours for minor adjustments.

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Solidend
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Maximum Capacity
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December, Pamber, 1

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thannel forms like above, equal to a plate, 15 ft. long, 15" wide, formerly a a planer at Koehring Co., Milwauae now cut on the DoALL at a labor as of \$16.50 each.

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#### SATILITY PLUS . . .

by: fastest method of removing metal but cuts any kind of metal or alloy, from at high carbon steel to soft brass. Does al and external band sawing, filing, pol-4 Available are 42 different saws, 20 file sand 3 polishers—a correct one to do each three efficiently.

Death effects spectacular savings in ad metal—takes the place of shaper, and lathe work in industrial and deplants all over the world.

to have a factory trained man call and rou what a DoALL can save in your plant.



FREE — Literature and interesting 158-page Handbook on Contour Machining—well worth sending for.

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December,

MODERN MACHINE SHOP

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# Remember: much depends on your using DEPENDABLE COOLANT PUMPS and BY-PASS RELIEF VALVES

Keep production moving . . . know that your equipment or products will perform properly. For uniform satisfaction rely on FULFLO PRODUCTS.

### CENTRIFUGAL COOLANT PUMPS

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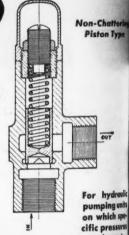
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#### **Horizontal or Vertical**

Built with amazing precision and so flexible that they can be installed to insure exact position of discharge. Many types to choose from for your individual purpose.



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You should have full details. Write today



Specialties Co., Inc.
BLANCHESTER, OHIO

MODERN MACHINE SHOP

December, If

MPULSES SHOULD BE TAKEN HOT A

ALTER EGO: Literally, "one's other self'—the still, small voice that questions, inspires, and corrects our conscious action.

We've got to buy a welder. That's settled; but I blow hot and cold on all of them. They don't seem to differ materially.

t60: There you are! When your is in a state of uncertainty—then the timpulse directs it to either side.

Then what BIG impulse will set my mind in a sure channel?

160: Forget welders. THINK ABOUT IT YOU WANT A WELDER TO DO 1701.

100 know we must get faster production, better welds and lower costs on all jobs.

160: Well, that in itself says you have DUAL CONTINUOUS CONso the operator can adjust for the MAIN, The Lincoln Electric Co. right TYPE and SIZE of arc to suit the job—to suit the position of the work—to suit his particular technique—to suit the type of joint—to suit the kind of metal. He gets these with the easy, fine adjustment of his DUAL CONTINUOUS CONTROL—just as simply as he gets the right station and the right volume on his radio.

LINCOLN SUGGESTS: To warm up to the right welding machine, base your analysis on performance values. Find out which machine, under all conditions and with all types of work, will produce the highest quality welds at lowest cost. A small advantage in performance often can save hundreds of dollars yearly—soon paying for the welder. Bulletin 412 will stimulate your impulses.

COLN SHIELD -ARC WELDING THE LINCOLN ELECTRIC COMPANY

1831 Monufacturers of Arc Welding Equipment in the World

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with FAST-SAFE ACCURATE

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ROLL FEEDS AND

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★ Wittek I matic Roll Feeds vide an improved simplified metho punch press open that insures rapidfing under all cotions. Made in f different types to all automatic fee requirements.

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Easily mounted on any make or size punch press.

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#### **Drill Is Ready for Action**

impection is the most important step in the manufacture of "Buffalo" Drilling ims. Spindles are indicated for "run-out," sliding heads checked for alignment, decked for alignment and squareness to the spindle, and the entire machine, as individual parts, given a running test for balance and vibration.

tic feet the indicator says O.K., it means your machine is ready to serve you either on any service of the production line or the keen precision of the tool room — ready you years of efficient, trouble-free service.

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Canadian Blower & Forge Co., Ltd., Kitchener, Ont.

DRILLING MACHINES

December mber, 1941 MODERN MACHINE SHOP

67



On the battlefronts of industry, Murchey equipment is producing accurate threads on aircraft parts, army ordnance, ships and their fittings, shells and bombs. Murchey Taps are producing Class 3 fits on airplane landing gear struts. Murchey Threading Machines are performing fast, accurate tapping and chamfering operations on shells and bombs. These are but two of the countless operations that Murchey equipment is doing with speed and accuracy, high labor and tool economy. Murchey Taps and Die Heads, Single and Double Head Threading Machines and the New Murchey No. 32 Hob Thread Milling Machine give manufacturers a complete line of highefficiency equipment that fully covers the extensive requirements of defense production. We are devoting our major efforts to improving production for national defense. Let us help you with your threading problems.

#### MURCHEY MACHINE & TOOL CO. DETROIT MICHIGAN



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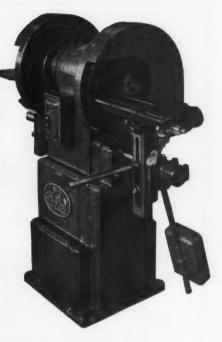
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December. rber, 194

### NUMBER FIVE SLY GRINDER

YOU cannot equal sly Grinder for speed, labor costs and all and efficiency on work which it is intended.

reis a Direct Connected or Driven Besly Grinder sturdy 3 H.P. Motor. The idle mounted in highte ball bearings carries MACHI Besly Titan Steelbacs id-On Abrasive Discs.



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I effect real economies in your tool room and on the

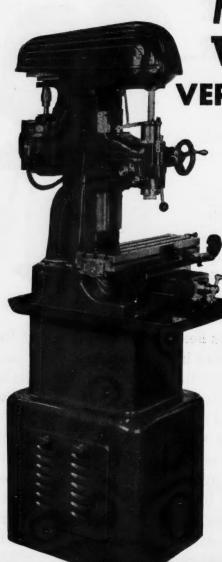
erecting floor. Just the machine for light manufacturing. Equip your plant with one of these modern Disc Grinders and enjoy the benefits of Besly grinding.

• If you operate a grinding machine employing the side of a wheel, learn what the Besly Titan Steelbac will do for you. These Bolted-On Abrasive Wheels have replaced the older type in most progressive shops.



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ARLES H. BESLY AND COMPANY



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> Equipped with Did cators and Meas Rods as illustrated the Vernon is invol for all types of sa jig-boring operations lieves or replaces her higher-priced equipment

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SPECIFICATIONS TABLE SIZE 6" x 71" LONGITUDINAL FEED . 12 **CROSS FEED** MAXIMUM DISTANCE TABLE TOP TO SPINDLE **QUILL FEED** 8 SPEEDS .. 250 RPM TO 4000 RPM COLLET CAPACITY .

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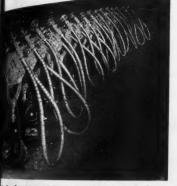
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TO HELP YOU
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of a battery of Stow machines ready for thipment for big defense operation.

Nather it's men or machine tools, workunder pressure soon shows if they've the 'guts'' to take it. That's why keds of shops working on National sase orders are turning to Stow Flexible & Machines. Every day, these sturdy, Proupose machines are meeting the turning out more work in a full day's walls—helping to get rush-production on time!

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# FLEXIBLE SHAFT MACHINES

#### PROMPT DELIVERIES

Due to greatly expanded plant facilities we can make deliveries on any of our 14 standard model, heavy duty machines within 2 to 5 days from receipt of order!

66 years. So, with Stow, you'll benefit from the most extensive flexible shaft experience in America. Let the name Stow be your guide in buying flexible shaft machines. I'd yays!

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Inventors of Flexible Shafts

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6" x 21"

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Hydraulic

# GRAND RAPIDALIA Surface Grinder

To Meet 1942's Exacti Needs --- as nothing else

• "Grand Rapids" Hydraulic Feed Surface Grinders guarantee tool room accuracy at table speeds up to 125 feet per minute.

 Heavy rugged one-piece column and base casting assures permanent alignment between the cross travel ways and the upright head.

 Patented vertical movement of wheel head makes it possible to split thousandths.



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GALLMEYER & LIVINGSTON CO

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GRAND RAPIDS, MICHIGA

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December,

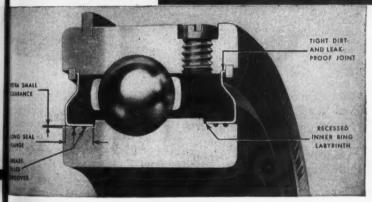
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Made to Standard Double-Row Widths
WITH 100% GREATER GREASE CAPACITY





dan, well-lubricated bearing is practically to Dirt, however, will relentlessly destroy we DIRT OUT AND KEEP THE GREASE IN, you are protected against noise, rejections, remature wear.

the illustration herewith, note the five disinfeatures that exclude dirt from the "CART-2" BALL BEARING. That minute clearance must be long seal flange and recessed inner is ALWAYS filled with grease. The grease in the inner ring are so many added and against the entrance of dirt.

a without any additional closures, the in-

tegral "CARTRIDGE" seals KEEP THE DIRT OUT AND THE GREASE IN—regardless of the position of motor or unit. In assembling or disassembling in the shop, the "CARTRIDGE" BALL BEARING STAYS CLEAN because its internal parts are never exposed.

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Precision Gage Blocks-



In cooperation with the National Defense effort, please furnish complete priority certificate when ordering.

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\$350.00 **Set 81-A** 

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WEBBER GAGE COMPANY

12899 TRISKETT ROAD

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ps, laster and deeper cuts, no shattering, 25% or more savings... that's the theadline story of the new DOUBLE-LIFE high-speed blade. Now in the hands distributors everywhere, this blade is ready to prove its value on your own prove that its special set differential eliminates drag and wear on the trailer... prove that its special heat treatment, leaving edges hard and ends and off, makes it super tough. Costing only 50% more than Blu-Mol single edge, EUFE does 100% more work — a minimum saving of 25% ... more when you over from other blades. An old dream, yes ... and now it's come true!

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WIE-LIFE distributor in your territory will be glad to sell you one or two blades own test. Or he'll give you a demonstration without charge or obligation. Wire, write Millers Falls Company today. We'll make the date for you.

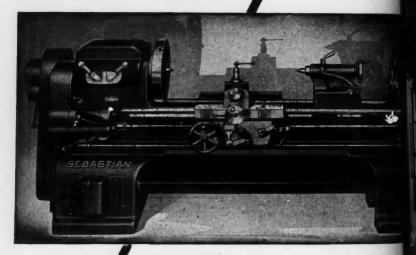
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#### Here are the principal features of all SEBASTIAN Type H Lathes . . .

 Timken Bearings on all shafts in headstock (including spins assuring accuracy and from 15% to 20% more power.

2. Oversized heat treated, hardened and shaved steel gears in stock assuring quiet operation.

3. Knob control handle for apron length feed friction (no springs) a mall has a positive in and out—very useful when approaching a shoulder.

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## Production or Tool Room Drilling



uilt sturdy for continuous producon work yet with accuracy for the nest toolroom work, Footburt rings) g maitives are all around favorites for mall hole drilling. The wide speed Thread range with backgear units from 185 2300 or from 277 to 3400 RPM takes it adaptable for drilling small oles in brass or aluminum or for

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counterboring holes up to lin' in tool steel.

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The essential service of Hollow Screws we owe to this combinate For without able, adequate distribution you could only be getting fraction of the supply you receive today. And without products see to the extra strains through decades of hardest use, you could not be machines to emergency peaks NOW.

Yes, the above "Pair" serve you indispensably.

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December.

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The operator of a G-F-P Press has no push buttons to press, no levers or valves to operate by hand ... he has both hands free at all times to handle the work. The G-F-P Press is controlled by foot pedal... the pressure applied to the work is always under instantaneous control of operator and varies in direct ratio to the

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force he exerts on the foot pedal. It is impossible to damage the press by overloading.

Ask the nearest office to explain the many other features that also help G-F-P Presses establish such exceptional production records.

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December, 1941

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EASIER SET-UP FOR TOOLROOMS

BETTER HOLDING FOR PRODUCTION

THESE PERMANENT MAGNET TYPE

CHUCKS ARE TIME-SAVERS ON —

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RECTANGULAR MODELS-

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SIZES

6" x 18" 8" x 24"

12" x 36" ROTARY MODEL —

9" Diameter

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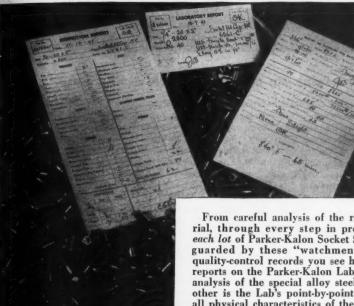
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PARKER-KALON Quality-Controlled **SOCKET SCREWS** Give the Green Light to Defense Assemblies

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36"

meter

From careful analysis of the raw material, through every step in production, each lot of Parker-Kalon Socket Screws is guarded by these "watchmen"...the quality-control records you see here. One reports on the Parker-Kalon Laboratory's analysis of the special alloy steel . . . another is the Lab's point-by-point okay of all physical characteristics of the finished screws. A third record covers an extensive series of critical inspections of dimensions and other details.

The uniformly high standard of quality which MUST RESULT from such rigid control is ample reason why industry specifies PARKER-KALON for important defense assemblies. Besides, it costs no more to have this protection against "doubtful screws" . . . screws that look all right but some of which fail to work right. Parker-Kalon Corp., 198 Varick Street, New York.



Quality-Controlled

16-point test-and-inspection routine covering: Chemical Analysis, Strength, Ductility, Hardness, Head and Socket Dimensions, Thread precision.



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## USED TO WILL

#### LIKE A CANDLE IN THE BREEZE

#### until a switch was made to TYCOL GREEN CAST GREASE

Numerous difficulties had been experienced with the grease previously used on the centrifugal boiler pumps and bearings on this company's chain stokers. On the advice of a Tide Water engineer they switched to Tycol Green Cast Grease. Since then the nuisance of having to keep an eye on the grease job and cleaning up the mess of drippings has been eliminated. Now they just put in Tycol Green Cast Grease and forget it. One less item to worry about — the grease stays put and does an economical and dependable job of lubricating.

Tycol Green Cast Grease can effect economies in your plant too. Its high lubricating quality and long trouble-free life are the result of years of extensive research by Tide Water engineers in their continuous efforts to develop "the correct lubricant for any and every industrial job."

Let a Tide Water engineer show you where economies can be made in your lubrication. Write the Tide Water Associated Oil Company, 17 Battery Place, New York, N. Y. Assistance is freely offered.

Regional Offices: Boston, Philadelphia, Pittsburgh, Charlotte, N. C.

#### TIDE WATER ASSOCIATED OIL COMPANY

EASTERN DIVISION

17 Battery Place . New York, N. Y.

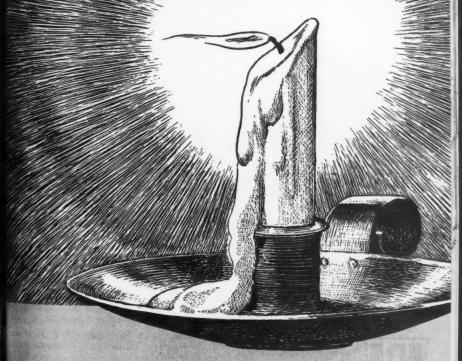
Veedol Motor Oil is another wellknown product of the Tide Water Associated Oil Company.



Tycol Green Cast Greases are made of paraffine stock cylinder oil which has high flash and fire points, with maximum film strength.



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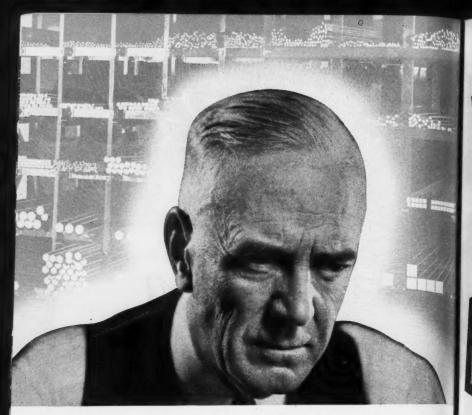




Just as a sponge controls the water it has absorbed, so is soap a thickening agent which controls the flow of the lubricant to the bearings.



Maximum economical lubrication per pound of grease is assured by the use of cylin der oil, making a minimum of soap necessary.



## He's worrying about Your Problems, tool



You're worrying because you may not be able to get all the steel bars you want. Your Union Drawn Distributor is worrying, too—because he may not be interposition to supply all the bars and shafting you require for normal needs—because he can't keep his stocks as complete as always—because he can't do more for you during these times when tremendous tonnages of stell are required for all-out defense production.

It's his business to serve you. If he can't, it means los of business, profits, customers and friends.

See your Union Drawn Distributor first. He'll east every effort to supply you with a few bars for a small job, or enough to get production started on a big job until mill shipments arrive. He can help you by say gesting the most efficient methods of processing stel—possible changes that may help you maintain production. As always, he's a good man to know.

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WHEN HIGH-QUALITY MILD STEEL WELDS ARE OF MAJOR IMPORTANCE



Wide acceptance based on proved performance shows that this electrode has no superior for all-position, high-strength welding of mild steel. It is being used with great success on structural welding, for fabricating steel plate, rolled sections and castings, for pipe lines, storage tanks, frames, bridges, for all classes of marine work and for welded fittings on unfired pressure vessels. Spatter loss is low—welding speeds are high with this modern electrode.

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Airco No. 78E meets the requirements of A.S.M.E.

Boiler Code paragraphs U-68, U-69 and U-70, and conforms to classification E6010 of A.W.S.-A.S.T.M. Filler Metal Spec. No. A233-407. It has the approval of Lloyds Register of Shipping Class 1 welding and of the Board of Standards and Appeals of the City of New York, Grade 10, for structural steel welding. Available in all diameters, this electrode produces welds developing tensile strengths ranging from 65,000-75,000 p.s.i. and has an elongation in 2 inches of 22-28%. Write Airco for full details.

Air, Reduction

General Offices: 60 EAST 42nd ST., NEW YORK, N. Y.

In Texas: MAGNOLIA-AIRCO GAS PRODUCTS CO.

AIRCO DISTRICT OFFICES IN PRINCIPAL CITIES

ing and Everything for GAS WELDING or CUTTING and ARC WELDING

MODERN MACHINE SHOP

December, 1941



Turning time on some vital parts for Navy use has been cut from 21 hours to  $3\frac{1}{2}$  hours...six times as fast... with Monarch automatic sizing controls. Automatic sizing, applied to Monarch lathes, provides automatic production on such work as any combination of steps, taper and contour turning, boring or facing.

Back of such Monarch contributions to lathe utility is that attitude which we call "The Phantom Gear." Made up of initiative, open-mindedness, courage to try new ideas, "The Phantom Gear" stimulates management and men to increase the usefulness and efficiency of Monarch lathes.

This vitalizing force, now enlisted in National Defense, has doubled our production in 1941 over 1940, without any sacrifice of quality. When peacetime returns, with its demand for more goods for more people, at lower cost, Monarch will be ready with still more useful lathes.

THE MONARCH MACHINE TOOL COMPANY . . . SIDNEY . OHIO



COVER THE TURNING FIELD

#### Monarch's March of hier

Monarch initiative le made the lathe a mu useful tool by the introduction of such improvements as:

Automatic sizing for size lathes

Helical geared headstock
Anti-friction bearin
mountings for all rotal
ing parts

Flanged spindle nose Automatic force feed lubrication

Anti-friction bearing upon attachment

Flame-Hardened beds

Even as the emergery presses us to more and more production, new refinements in design and shop practice are continuously at work to maintain Monarch leadership.

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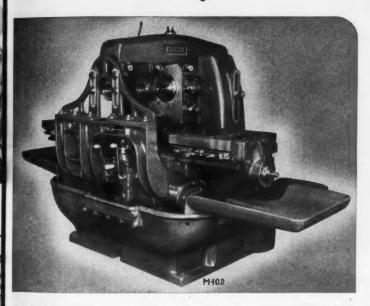
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The Ohio Production Milling Machine is ready to show you why it has made a record for trouble-free, profitable operation. It is adapted equally to steady, gruelling production and to short runs on which set-up time is a main factor. Its convenience and accessibility are outstanding. Rugged design permitting climb is worthy of careful consideration. So are certain other features about which we shall be glad to give you complete information.

THE OHIO MACHINE TOOL COMPANY, KENTON, OHIO

## OHJO DREADNAUGHT HORIZONTAL BORING, DRILLING AND MILLING MACHINES - SHAPERS - PLANERS

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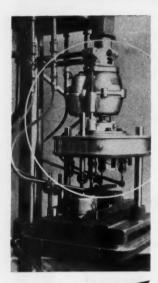
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## Defense Production + + +



Etter FOOT-OPERATED TAPPING MACHINE

Unskilled labor can maintain a high production of accurately tapped holes on this machine because ETTCO design eliminates the human element from the actual tapping operation. 2400 tapped holes per hour is normal production with the standard 2 - spindle head while with the ETTCO Multiple Heads described below, production can be stepped up to 12,000 holes per hour.

Full details in Bulletin No. 4.



Interchangeable tapping or drilling heads for ready attachment to any drill press, made entirely of stock parts, "tailored to fit" your specific jobs. You send a drawing or sample part—we do the rest. The quick, low-cost way to tool up for multiple tapping and drilling.

Full details in Bulletin No. 3.



#### ETTCO TOOL CO.

598 JOHNSON AVE., BROOKLYN, N. Y.

DETROIT

CHICAGO

ETTCO TAPPING AND DRILLING EQUIPMENT

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## THIS Etter TAPPING and \* \* \* its part to speed up



Ettco:
HIGH-SPEED
TAPPING
ATTACHMENTS

These attachments make possible fast, accurate tapping on any drill press. Their positive, yet exceptionally sensitive friction clutch permits high-speed tapping with

full tap protection. Friction members are replaceable as a unit in a few minutes. Sizes for No. 0 to I" taps. Full details in Bulletin No. 2.





These chucks save time and taps and promote accuracy because the visible grip assures true centering on the round and positive driving on the

the round and positive driving on the square every time. 5 sizes for No. 0 to 1" taps. Details in Bulletin No. 6.





These chucks have been Industry's favorites for over 20 years because they eliminate the key and because of their strong, long-wearing construction. They save time and energy and are good for years of hard, continuous service—the finest drill chucks that money can buy.

Full details in Bulletin No. 6.

MENT 15 YEARS OF SPECIALIZATION ARE BACK OF

25

## MACHINE OF THE MONT

REPARED BY THE SENECA FALLS MACHINE CO. "THE SO-SWING PEOPLE" SENECA FALLS, NEW!

#### Lo-swing IMP LATHE AUTOMATICALLY TURN



AND FACES
COMMUTATOR
TO HIGH
ACCURACY AND
FINISH
REQUIREMENTS

Problem: To automatically turn and face electric starter commutators; to provide a fine finish and maintain extremely close tolerances.

Solution: The Lo-swing IMP Lathe with special equipment was selected for this job primarily because of inherent design features. Its spindle bearings are designed to permit the very high spindle speeds necessary for turning copper alloy, and the method of fitting the carriage to the bed, with flat and "V" ways, assures unusual turning accuracy.

The work is held and driven from one of the ball bearing seats of the shaft with an airoperated collet chuck. The tailstock end is supported on the other bearing seat by a collet chuck mounted in a revolving spindle which is operated through the air-controlled tailstock spindle quill. This method of hold-



Close-up showing detail of template-controlled facing tool on Back Attachment.

AL

ing and driving the rotor from the blocaring seats assures the close communicity which is required between the baring seats and the O.D. of the community

The operation consists of turning the 0.1 of the commutator, the facing of the and lar shoulder (which is part of the and mutator) and the chamfering of the backer. It should be noted that the 6° and is faced with a template-operated to block in order to obtain a very made finish, free from all chatter marks.

LATHE NEWS from SENECA FALL

## W DEMAGNETIZERS

Engineered for quick removal of magnetism from work. Model B-2 is for large jobs and Model J-1 for small work. A single pass over the stationary poles demagnetizes the work completely.



Also Manufacturers of

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DIVIDING HEADS
LATHE CHUCKS,
POWER HACK SAWS
MAGNETIC CHUCKS
MILLING MACHINE VISES

MODEL B-2

Model B-2 working surface 7<sup>3</sup>/<sub>4</sub>" x 12" x 6<sup>3</sup>/<sub>4</sub>" . . \$63.20 Model J-1 working surface 7<sup>1</sup>/<sub>4</sub>" x 7<sup>1</sup>/<sub>4</sub>" x 6<sup>3</sup>/<sub>4</sub>" . \$41.15

Both Demagnetizers equipped with pilot light signal controls.

Operates on 110 volt AC current.

L-W CHUCK CO.

20 N. ST. CLAIR ST.,

TOLEDO, OHIO



- Standardized Spindle Nose Spindle heat-treated chrome-nickel steel with No. 40 taper.
- Motor in Base Drive U. S. Vari-Drive motor. Twin-Disc Duplex Machine Tool Clutch.
- **Heavy Rugged Construction** Heavily proportioned column houses motor drive and power shafts.

A modern machine for a wide range of pre-

Working surface and overall size of table, 46" x 101/2". Longitudinal range, 25". Transsent day milling needs. verse, 9". Vertical, 19". 16 geared feeds. Infi-

nite spindle speeds, 25 to 500 r.p.m.

Write or wire for complete data and illustrated folder.

Manufactured and Sold by

20

#### JOHNSON CUT-OFF BAND SAW

NEW FEATURES -- HEAVY DUTY EFFICIENT -- FAST



Here is the latest in Metal Cut-Off Band Saw.

Carefully engineered and stream-lined, it prsents unbelievable value. The boxtype frame is distortion-proof, its 3-point suspension makes the roughest floor a GOOD MACHINE SPACE. Heavily built throughout. Casters optional.

HERE IS VALUE, write for complete data.

### JOHNSON MACHINE WORKS, Inc.

ALBION, MICH.

Sales Office: 5000-04 CHRYSLER BUILDING, NEW YORK, N. Y.

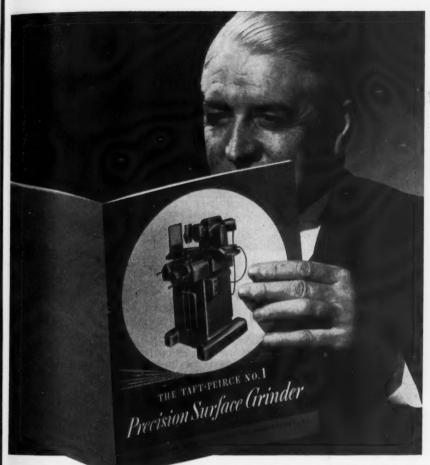
Attention Dealers! Sales Franchises Open.

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#### HERE'S YOUR COMPLETE NEWS BULLETIN

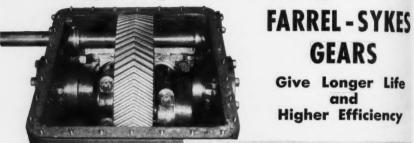
Just off the press is an 8-page publication giving full, illustrated information on this entirely new type of surface grinder for small tools and parts. Shown and described are the tilting wheelhead which permits angle and shoulder grinding, the hardened

ways and ball mountings, and other exclusive features which assure you of the ultimate in precision, with higher output and less effort on the part of your operators. A line on your letter-head will bring you a copy of this new bulletin.

The TAFT-PEIRCE MANUFACTURING CO., WOONSOCKET, R. I.



## In Heavy Duty Oil Pumping Service



Dean Brothers Horizontal Duplex Power Pump and (above) open view of the Pump Drive showing Farrel-Sykes Continuous Tooth Herringbone Gears.

> posed helices balancing and absorbing axial thrusts within the gear member, thus preventing harmful thrust loads and resultant stresses on other parts of the machinery.

Farrel-Sykes Continuous Tooth Herringbone Gears give increased life, extra load-carrying capacity and greater operating efficiency where continuous service without failure is a vital consideration.

Gears and machinery used in oil field

service have to be built to "take it."

That is one reason why Dean Brothers

use Farrel-Sykes Gears in their extra

heavy power duplex pump here illus-

The combined characteristics of overlap or interlacing of the teeth, creeping engagement and inclined line of pressure maintain the involute profile and correct tooth action throughout the life of the gears.

The continuous herringbone teeth of Farrel-Sykes Gears, with their greater bearing surface and larger number of teeth in contact, provide that extra strength necessary to carry heavier loads and to withstand shocks, stresses and wear.

These inherent advantages of Farrel-Sykes Gears result in dependable performance, high efficiency and minimum maintenance and operating costs.

Wear is further reduced by the op-

There is a Farrel-Sykes Gear and Gear Unit for every type of service and for any capacity. Farrel engineers are available for consultation on gear problems.



FARREL-BIRMINGHAM COMPANY, Inc.
381 VULCAN ST. . . . BUFFALO, N. Y.

The Gear with a Backbone

trated.

17

# FLOATING TOOL HOLDERS

The use of Apex Floating Tool Holders is a sure method of producing uniform and accurately reamed holes. Apex Floating Tool Holders can be used on any machine in any position. Friction in the holder is practically eliminated by the patented ball drive.

All parts are hardened and ground, and are interchangeable. The amount of float may range from a few thousandths to 1/8".

Shanks may be had in any taper or straight diameter, adapter shanks to General Motors or Chrysler Motor standards, key drive or special drive to suit machine spindle. Sockets may be had for Morse Taper or Straight shank tools.

Available with square drive collets, interchanging with those used on Apex Safety Friction Tapping Chucks, Positive Drive Chucks and Vertical Float Chucks, and with collets interchangeable with Quick Change Drill Chucks. Tap capacities to 21/4": reamer capacities to 5".



Extended
Socket Type

WRITE FOR CATALOG No. 8.



Short Nose Type with Morse Taper Sockets

The APEX MACHINE & TOOL Co.

Dayton, Ohio

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Collet Type



#### VAN NORMAN RAM TYPE UNIVERSALS

Help to Speed Curtiss-Wright's Milling Work

In the Buffalo plant of the Curtiss-Wright Corporation, No. 26 Ram Type Universals keep toolroom milling output up to top levels, day in and day out. For this uniquely adaptable machine accommodates the work of several single-purpose machines . . . takes any number of successive cuts from horizontal to vertical, without resetting the work on the  $50^{\prime\prime} \times 12^{\prime\prime}$  table. Operator finishes one cut, then quickly swings the cutterhead into position for the next cut, thus avoiding many chances for errors. And what is more, he ends the day far less fatigued and with far more work to his credit.

New men can turn out good work right from the start, with this easily operated No. 26 which provides front and rear directional controls of power feeds . . . 6-way rapid traverse of table, knee and saddle . . extra-large dials for easy, accurate reading. The No. 26 is modern, rigid, fast, built to maintain unvarying accuracy. Write for complete information on this modern milling machine.

VAN NORMAN MACHINE TOOL CO., SPRINGFIELD, MASS.

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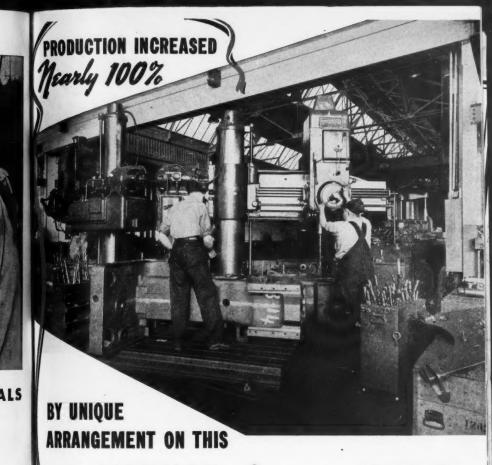
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## FOSDICK Economax RADIAL

Here's a job at the Kearney & Trecker plant that definitely illustrates the versatility and economy of Fosdick Radial Drills.

By means of a special base, one milling machine column is mounted on each side of the Radial Column. While one operator sets up the milling machine column and locates jigs in operating position, the Radial operator drills and taps the required holes on his work. When completed, he swings the head over the other milling machine column, so that holes can be drilled and tapped, removes completed column and sets up another one in its place. By this time the latter column is finished and the operation of setting up is duplicated. Thus operation is practically continuous and production has been increased almost 100%.

Let us show you how Fosdick Radials can save for you.

Write for Bulletin MSR.

Let

BUILT IN

SIX SIZES

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1 3' to 8' inclu-

to cover all

al Drill applications.

TOSDICK MACHINE TOOL COMPANY

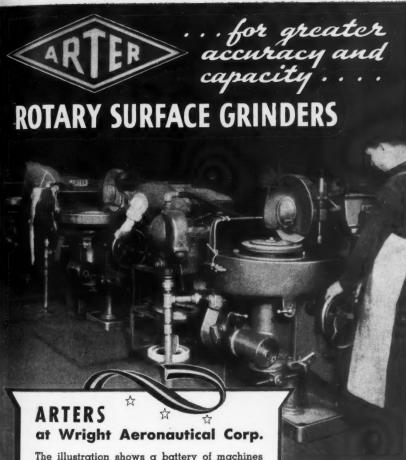


Nearly all the facts you need to know about the selection, making, use, and maintenance of Carbide Cutting Tools are packed into the pages of this 64 page, 2 color, pocket size handbook, just off the press. It's yours for the asking . . . a Firth-Sterling contribution to the National Defense effort, where practical knowledge of Carbide Tools is essential to increased production. Every machine tool operator and apprentice, tool engineer, tool room foreman, machine shop superintendent, or anyone concerned with the purchase, use and care of small tools, should have this invaluable book. A request on your company letterhead will bring your copy by return mail. The supply is limited, so act at once.

FIRTH-STERLING

OFFICE AND WORKS

MCKEESPORT PA
BRANCH WAREHOUSIS
NEW YORK CHICAGO
HARTFORD PHILADILPHIA
LOS ANGELES DAYTON
CLEVELAND DESCRIPTION



The illustration shows a battery of machines engaged in various surface grinding operations on cams. This is but one of the many Arter jobs at Wright's. Other machines are grinding master rods, gears, crank cases, and many other parts, to that fine precision required for Wright Cyclone Engines.

ARTER Model A Rotary Surface Grinders as illustrated above are made in diametrical capacities of 8", 12" and 16". Larger machines hydraulically operated are made in capacities up to 40". All machines have comparatively great vertical capacity and a tiltable work table.



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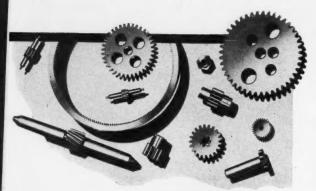
GRINDING MACHINE CO.

MODERN MACHINE SHOP

December, 1941

## Combined ADVANTAGES

NEVER BEFORE AVAILABLE TO THE PRODUCER OF FINE-PITCH GEARS



This 3-inch Fine-Pitch Gear Shaper is especially adapted to the cutting of gears and other parts for bomb and time fuses, range finders, meters, geared camera shutters, movie cameras and projectors, clocks, etc.



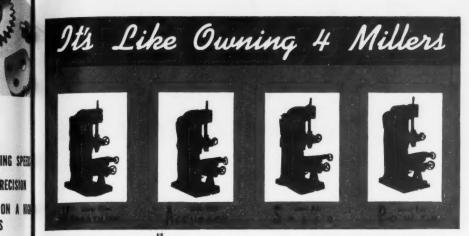


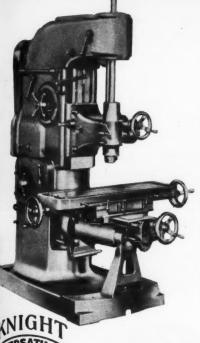
- NEW HIGHER CUTTING SPEN
- # "GEAR SHAPER" PRECISION
- ACCURATE GEARS ON A HAP PRODUCTION BASIS
- ★ WIDE VARIETY OF WORK ©
- # QUICK SET-UP
- ★ QUICK CHANGE OVER RO SPUR TO HELICAL GEARS
- FOOT LEVER OPERATED, WON HOLDING, CLAMPING, AL EJECTING MECHANISMS.
- AUTOMATIC MAGAZINE FE AND AUTOMATIC WORK BE TION IF DESIRED.

Cutter-Spindle Speeds Up 1 2,000 Strokes per Mins

enable this new 3-inch Fellor Gear Shaper to turn out so fine-pitch gears at rates hither unheard of. If you are main spur or helical, internal or este nal gears of small size, you wi want a copy of the new Bulleti describing this machine.

THE FELLOWS GEAR SHAPE





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#### THE KNIGHT MILLER

GIVES YOU

**Versatility : Accuracy : Speed : Power** 

When you get the balancing of these four qualities in one millerit's like owning 4 Millers.

The No. 40 Knight Miller has the VERSATILITY to handle a wide range of work - can split thousandths on a job requiring ACCU-RACY-boosts profits on the work calling for SPEED—meets the jobs that demand POWER.

Write for further information about the No. 40 Knight Miller. Ask about time-saving features that give you maximum utility from one miller.

Write today.

W. B. KNIGHT MACHINERY CO.

ST. LOUIS

MISSOURI

MODERN MACHINE SHOP

December, 1941

## a Toolmaker...

## TO RUN A CINCINNATI CENTERLESS

perating a CINCINNATI Centerless Grinder is just about as simple as operating household equipment. Once set up, there's little to do other than handle the work. Almost anyone can run the machine. The Centerless is safe, too. As soon as the work contacts the wheels, the regulating wheel takes over the job of feeding the work through the grinding throat (thru-feed jobs), reducing or entirely eliminating the necessity of placing the hands near the wheels.

Coupled with this simplicity of operation are the simple, rigid and compact working elements of the machine . . . FILMATIC Grinding Wheel Spindle Bearings, which never seem to wear out or require adjustment . . . hardened alloy steel gears and shafts . . . principally automatic lubrication.

These two qualifications—simplicity of operation—absence of service requirements—are highly important factors today in solving the production problems of your precision ground parts. The following publications will be of help to you in deciding which additional parts can be ground by the low-cost Centerless method.

G-472 "Centerless for Small Lots"

G-456 No. 2 Centerless Catalog G-438 No. 3 Centerless Catalog



SEE OUR CATALOG IN SWEET'S

CINCINNATI GRINDERS INCORPORATED SINCHAR

MACHINES ... CENTERTYPE GRINDING MACHINES ... CENTERLESS GRINDING MACHINES ... CENTERLESS LAPPING MACHINES

## You Don't Need





Left—CINCINNATI No. 2 Centerless Grinding Machine grinds a host of peace-time and defense articles in a wide variety of materials: small motor shafts and rotors, bowling balls, glass bottle stoppers, aircraft engine parts, shells of various calibre, etc.

#### THE CINCINNATI MILLING MACHINE CO.

FOOM AND MANUFACTURING MILLING MACHINES... SURFACE BROACHING MACHINES... CUTTER SHARPENING



Look ahead..keep ahead.. with Gisholt improvements in metal turning We've been advancing rapidly all along the machine tool front—winning new victorius our shortages of time and manpower on bundreds of machining operations.

Yes, today the new Gisholt Turret Lathum turning metals for many vital parts in leutha one-half the time required only a few years of And with far greater accuracy, too!

That's progress—the kind of progress that is backing up America's swift-moving defent program! And it's the kind of progress that is important to you, as a manufacturer.

When you plan increasing production, now w in the future, investigate the many ways then no Gisholts can save minutes, manpower, and must



GISHOLT MACHINE COMPANY

RIVETT 715



All in a Name:

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"RIVETT" stands for 53 years experience in the building of precision bench lathes. "715" stands for a sensitive high speed, light duty, precision bench lathe having 7" swing and 15" center distance. The spindle runs in true dynamic balance at selective speeds from 100 to 3500 r.p.m. and takes draw-in collets up to 34" diameter capacity. For further information on this and other Rivett bench lathes write today.

LATHE & GRINDER INC. BRIGHTON, BOSTON, MASS. DEVELOPMENT LATHE

MODERN MACHINE SHOP

December, 1941



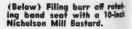
THERE must be no compromise with maximum effectiveness in your Uncle Samuel's defense equipment . . . no faulty weapons-no faulty shells. There must be good tools to support the skill of the hands that make them. Here are four hand-filing operations in a munitions plant manufacturing 3-inch anti-aircraft shells. The files are Nicholson.

Because of their high qualities for fast and accurate work-and because there is always available The right file for the job-Nicholson and Black Diamond Files are in every kind of defense industry. At mill-supply houses.

FREE TECHNICAL BULLETINS on special Brass, Aluminum, Stainless Steel, Foundry, Die-cast, Die-makers, Shear Tooth, Plastics and Long Angle Lathe files. Write us for your copies.

NICHOLSON FILE CO., PROVIDENCE, R. I., U. S. A. (Also Canadian Plant, Port Hope, Ont.)





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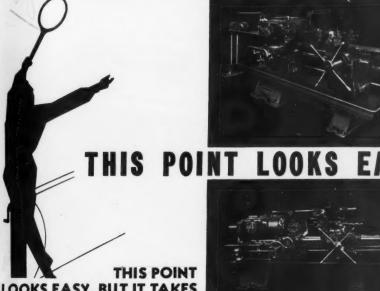
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(Below) Removing slivers from machined rotating band with a 12-inch Nicholson Knife File.





LOOKS EASY, BUT IT TAKES MORE THAN ONE POINT TO WIN THE BIG MATCH

Today it's possible for every reputable manufacturer to secure big volume contracts for defense production.

But that's only the first point you've got to win.

5

To emerge victorious in the swift, grim game that the whole world is playing, we must all win point after point in the struggle for more and more production.

When armament orders end, costly special purpose equipment will be of

Ram & Saddle Type Universal Turret Lathes no further use, while long-lived Jones & Lamson machines can be turned readily into earning new profits, meeting peacetime demands at low production costs.

It pays to have Jones & Lamson engineers work on your equipment problems. It will not obligate you to write us at once, and your inquiry will receive prompt study to help you speed production today and earn new profits tomorrow.

#### LAMSON MACHINE

SPRINGFIELD, VERMONT, U. S. A.



PROFIT PRODUCING MACHINE TOOLS

Manufacturers of Ram & Saddle Type Universal Turret Lathes . . . Fay Automatic Lathes . . . Automatic Thread Grinding Machines . . . Comparators . . . Automatic Opening Threading Dies and

Chasers



WHAT you see above is the main drive on a Heald Bore-Matic. Turn on the power and the whole unit gently vibrates at the rate of approximately 1200 times a minute. This is a lot of jiggling, but it stops right there. Heald engineers saw to that, for vibration must be entirely eliminated for best results in precision boring. First they quarantined this worst of vibration offenders — the drive motor, the clutch and brake drive and the hydraulic pump - by isolating these units low down at the rear of the base. Then they mounted the entire unit on vibration dampeners so that practically zero vibration escapes to the base. To make doubly sure they included multiple "V" belt drive from the motor, and flexible tubing between pump and hydraulic system to insure smooth transmission of power. And that is not all. Bore-Matics, too, have the clutch and brake unit also mounted on vibration dampeners . . . multiple "V" belt drive to boring heads . . . the base itself is extremely massive, rigid, to absorb any stray vibration. All these are reasons why Heald Bore-Matics are able to produce "tenth" precision consistently . . . and are A-1 reasons why Heald Bore-Matics should be seriously considered for every precision boring job.

#### NO VIBRATION HERE!

Outstanding characteristic of Heald Bore-Matics is the practically complete absence of vibration in the boring spindles. Machine elements that might cause undesirable spindle flutter are entirely isolated from spindles, as explained the left. Result is that on Heald Bore-Matics you can get tremely good accuracy finish consistently, and mum life from tools, to



HEALD MACHINE CO. WORCESTER, MASS. U. S.

## Higher Production for Low Cost



Invariably, the installation of LANCO Die Heads leads to lower threading costs and higher efficiency.

That this is a fact, is proven by the following performance record in a well-known Detroit plant.

LOW COST-2400 inch of thread per chaser grind.

ACK

S. U. S.

PRODUCTION-200 eyebolts, 34" dia., 16 pitch, 3" thread length per hour.

ACCURACY-Class 3 fit.

Are you interested in duplicating this performance?

LANDIS MACHINE COMPANY WAYNESBORD

# Everything under control WITH TIMKEN BEARINGS ON THE HOB SPINDLE







Photograph shows a Barber-Colman Type A Hobbing Machine producing splined transmission shafts for heavy duty Diesel tractors. 5 complete 16-key heat-treated spline shafts approximately 21" long and 2½" O.D. are turned out in 8 hours. Material, S.A.E. 1045 steel forging, 241-285 Brinell hardness. Feed, 0.050" per revolution of work. Hob speed, 82.5 R.P.M. Hob spindle mounted on Timken Tapered Roller Bearings.

This job is a real test of accuracy as well as speed. Some indication of the hob spindle smoothness and freedom from chatter is afforded by the fact that the hob nets 1,687 lineal inches of spline per sharpening.

Results like this are typical of all kinds of heavy duty machines equipped with Timken Bearings. Timken Bearing Equipped machines are modern at the start and stay that way for many extra years of service. You need them now; you will need them even more in the years to come.

THE TIMKEN ROLLER BEARING COMPANY, CANTON, OHIO

## **Tapping Trouble?**

#### CHECK THESE POINTS

If your taps are breaking, or not cutting smooth, proper size threads, it may not be the taps' fault. Here are a few things to check to help you locate and correct tap trouble May to the Total

#### TYPE OF HOLES TO BE TAPPED

TYPE UP HOLLES TO BE TAPPED
If a shind hole, is there sufficient imapped space,
at the bottom for the secumulation of chips?
is a "tim," in the secumulation of chips abead, being
used? (In a spell hat shoots the chips ahead, being
used? (In a spell hat shoots the chips ahead, being
used? (In a spell hat shoots the chips ahead, being
used? (In a spell hat shoots and the "tim" tap is
not recommended.)

Do roughtense call for as theo or three fluted tap?

#### CLASS OF FIT REQUIRED

If the tap produces an oversize hole, has the proper tap been selected for the class of fit desired? If proper tap is being used, is there any play in the work or tap holding spindles (provided rigid spindles are being used)?

Do the work and tap line up accurately?

#### TYPE OF MACHINE

Is drive uneven because of Is machine powered prop-

Are tap and drilled hole in alignment?

there undue wear on sliding parts?

#### TAPPING SPEEDS Is the speed too slow?

Is the speed too fact?

#### TAPPING DIFFERENT MATERIALS

Has the tap proper cutting face for the particular material being tapped?

Is the tap of the proper design or type?

#### PROPER HOLE SIZES BEFORE TAPPING As the drilled hole of the proper size?

Is the skilled hole perfectly round?

Is the axis of the hole parallel to the axis of the tap?

#### **ALIBRICATION**

Has the proper lubricant been employed?

Does the lubricant flood the tap sufficiently while engaged in the hole?

Is there sufficient force behind the lubricant to ash away the chips?

If applied with a brush has the lubricant a auffi-ciently heavy body to adhere to the lap? (A light lubricant will be skrown off the revolving tap before it centers the hole.)

#### TAP HOLDING DEVICE

Is worn or wrong type of holder being used? Is holder in alignment with drilled hole?

#### CHAMFER

Is the point diameter of tap carrect for the size of hole being tapped? Does the tap enter the hole an excessive number of threads before taking hold, thereby losing the characteristic of the entire characteristics. chamfered portion?

Is the chamfer the correct length?

Is the chamfer chipped or dull and in need of re-



(This is one of a series of

advertisements published by

Greenfield Tap & Die Cor-

poration to help users get

greater production from their

small tools in these critical

times, through making use-,

ful facts more widely known

#### GREENFIELD TAP AND DIE CORPORATION

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HE NATIONAL DEFENSE PROGR



Completely Cold Forged METHOD PATENTED AND USED

EXCLUSIVELY BY HOLO-KROME

## O-KROP & SOCKET SCREW

SOCKET SCREW STAND AVAILABLE WRITE DE

